

Participant Handbook

ENENTARY CORFACION. TEWAN JAON - ELEN



ELEMENTARY CORE ACADEMY

6517 Old Main Hill Logan, UT 84322-6517

435-797-0939 http://coreacademy.usu.edu

UtahState UNIVERSITY

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Utah State Office of Education (USOE)

Utah State University (USU)

State Science Education Coordination Committee (SSECC)

State Mathematics Education Coordination Committee (SMECC)

Special Education Services Unit (USOE)

Individuals:

Academy Coordination Committee: Max Longhurst,

Brett Moulding, Nicole Paulson, Velma Itamura, Janet Gibbs

Academy Director: Max Longhurst

Academy Coordinator: Megan Richards

Academy Facilitators and Contributors: Cindy Garfield, Keri Greener, Lissa Jensen, Val Josephson, Deanna Martineau, Ann

Syphus

Academy Presenters: Becky Bryner, Lori Doutre, Marie Gardner,

Ryan Murray, Raylynne Phillips, Nate Wright

Credits for editing, compiling, formatting, and assisting with the materials and delivery of the Elementary CORE Academy are given to Ami Israelsen and Elizabeth Shaw.

UTAH STATE OFFICE OF EDUCATION

Leadership...Service...Accountability

Patti Harrington, Ed.D. State Superintendent of Public Instruction
Voice: (801) 538-7500 Fax: (801) 538-7521 TDD: (801) 538-7876
250 East Cesar E. Chavez Blvd. (500 South) P.O. Box 144200 Salt Lake City, Utah 84114-4200

Dear CORE Academy Teachers:

Thank you for your investment in children and in building your own expertise as you participate in the Elementary CORE Academy. I hope your involvement helps you to sustain a laser-like focus on student achievement.

Teachers in Utah are superb. By participating in the Academy, you join a host of teachers throughout the state who understand that teaching targeted on the core curricula, across a spectrum of subjects, will produce results of excellence. The research is quite clear—the closer the match of explicit instruction to core standards, the better the outcome on core assessments.

I personally appreciate your excellence and your desire to create wonderful classrooms of learning for students. Thank you for your dedication. I feel honored to associate with you and pledge my support to lead education in ways that benefit all of our children.

Sincerely,

Patti Harrington, Ed.D.

Pari Manigh

State Superintendent of Public Instruction

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Appreciation is expressed for the tremendous educational input and monetary commitment of several organizations for the successful delivery of the Elementary CORE Academy. This year's Elementary CORE Academy was developed and funded through a variety of sources. The Utah State Office of Education (USOE), in collaboration with Utah State University (USU) and local school districts of Utah, have supported kindergarten through sixth grade teachers with professional development experiences that will enhance the educational experience for Utah children.

Major funding for the Academy comes from the following sources:

Federal/State Funds:

Utah State Office of Education Staff Development Funds Special Education Services Unit ESEA Title II

Utah Math Science Partnership

District Funds:

Various sources including Quality Teacher Block, Federal ESEA Title II, and District Professional Development Funds

School Funds:

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The state and district funds are allocations from the state legislature. ESEA is part of the "No Child Left Behind" funding that comes to Utah.

Additionally, numerous school districts, individual schools, and principals in Utah have sponsored teachers to attend the Academy. Other educational groups have assisted in the development and delivery of resources in the Academy.

Most important is the thousands of teachers who take time from their summer to attend these professional development workshops. It is these teachers who make this program possible.

Goals of the Elementary CORE Academy

Overall

The purpose of the Elementary CORE Academy is to create high quality teacher instruction and improve student achievement through the delivery of professional development opportunities and experiences for teachers across Utah.

The Academy will provide elementary teachers in Utah with:

- 1. Models of exemplary and innovative instructional strategies, tools, and resources to meet the Core Curriculum standards, objectives, and indicators.
- 2. Practical models and diverse methods of meeting the learning needs of all children, with instruction implementation aligned to the Core Curriculum.
- 3. Meaningful opportunities for collaboration, self-reflection, and peer discussion specific to innovative and effective instructional techniques, materials, teaching strategies, and professional practices in order to improve classroom instruction.

Learning a limited set of facts will no longer prepare a student for real experiences encountered in today's world. It is imperative that educators have continued opportunities to obtain instructional skills and strategies that provide methods of meeting the needs of all students. Participants of the Academy experience will be better equipped to meet the challenges faced in today's classrooms.

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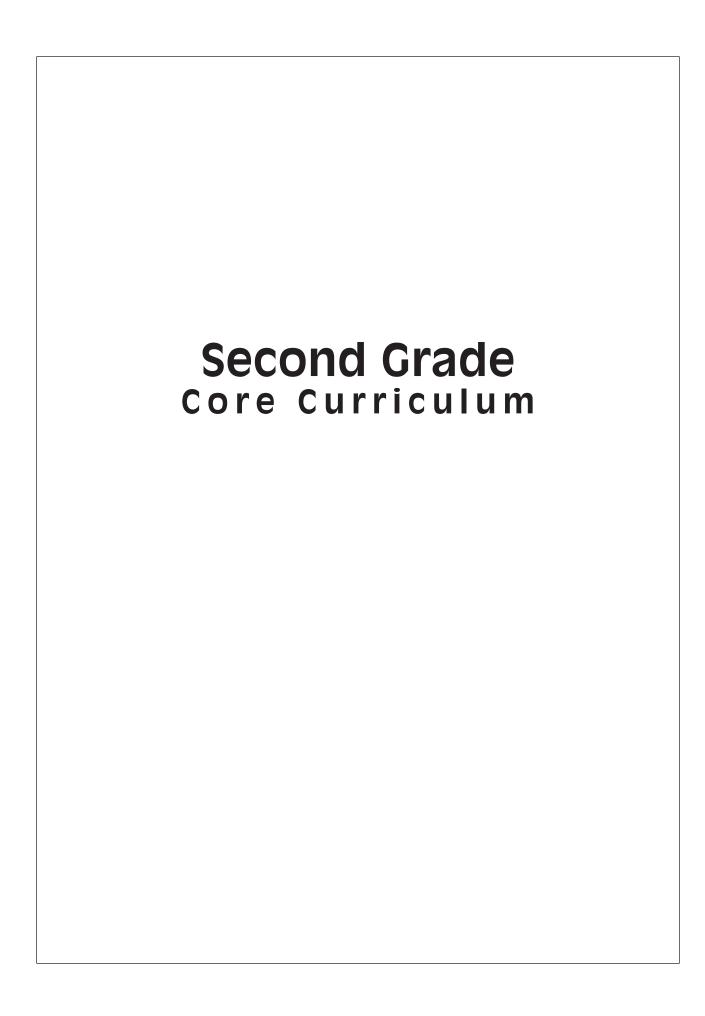
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Academy Handbook Second Grade



K-2 Core Curriculum

Introduction

Most students enter school confident in their own abilities; they are curious and eager to learn more. They make sense of the world by reasoning and problem solving. Young students are active, resourceful individuals who construct, modify, and integrate ideas by interacting with the physical world as well as with peers and adults. They learn by doing, collaborating, and sharing their ideas. Students' abilities to communicate through language, pictures, sound, movement, and other symbolic means develop rapidly during these years.

Literacy requires an understanding of listening, speaking, reading, writing, and viewing in many forms including print and electronic images. Today, more than ever, students must have the ability to think critically while applying new information to existing knowledge. Therefore, school literacy programs need to involve students in learning to read and write in situations that foster critical thinking and the use of literacy for independent learning in all content areas.

Young students are building beliefs about what mathematics is, about what it means to know and do mathematics, and about themselves as mathematical learners. Mathematics instruction needs to include more than short-term learning of rote procedures. Students must use technology and other mathematical tools, such as manipulative materials, to develop conceptual understanding and solve problems as they do mathematics. Students, as mathematicians, learn best with hands-on, active experiences throughout the instruction of the mathematics curriculum.

Language Arts and Mathematics are the tools for doing work in other areas. These content areas need to be integrated into other curriculum areas to provide students with optimal learning. The curriculum becomes more relevant when content areas are connected rather than taught in strict isolation. For this reason, the content areas of the Fine Arts, Health Education, Physical Education, Science, and Social Studies have been combined to enable teachers to teach more efficiently and students to learn in a real-life context that enhances lifelong learning.

The Kindergarten through Second Grade Core describes what students should know and be able to do at the end of each of the kindergarten, first, and second grade levels. It has been developed, critiqued, and revised by a community of Utah teachers, university

 Young children learn by doing, collaborating, and sharing their ideas.



Organization of the K-2 Core:

- Intended Learning Outcomes
- Standard
- Objective
- Indicator

educators, State Office of Education specialist, and an advisory committee representing a wide variety of people from the community. The Core reflects the current philosophy of education that is expressed in national documents developed by the International Reading Association, National Council of the Teachers of Mathematics, National Standards for Arts Education, Information Power, National Association for Sport and Physical Education, American Association for the Advancement of Science, National Council for the Social Studies, International Society for Technology and Education, and Early Childhood Standards.

Organization of the K-2 Core

The Core is designed to help teachers organize and deliver instruction.

- Each grade level begins with a brief course description.
- The Kindergarten, First, and Second Grade INTENDED LEARNING OUTCOMES describe the goals for students to gain knowledge and understand their world. They are found at the beginning of each grade level, are an integral part of the Core, and should be included as part of instruction.
- The first Core area consists of the Language Arts curriculum.
- The second Core area consists of the Mathematics curriculum.
- The third Core area consists of the subject areas of the Fine Arts, Health Education, Physical Education, Science, and Social Studies.
- A STANDARD is a broad statement of what students are expected to understand. Several Objectives are listed under each Standard.
- An OBJECTIVE is a more focused description of what students need to know and be able to do at the completion of instruction. If students have mastered the Objectives associated with a given Standard, they have mastered that Standard at that grade level. Several Indicators are described for each Objective.
- An INDICATOR is a measurable or observable student action that enables one to assess whether a student has mastered a particular Objective. Indicators are not meant to be classroom activities, but they can help guide classroom instruction.

Guidelines Used in Developing the K-2 Core

The Core is:

Consistent With the Nature of Learning

The main intent in the early grades is for students to value learning and develop the skills to gain knowledge and understand their world. The Core is designed to produce an integrated set of Kindergarten, First, and Second Grade Intended Learning Outcomes for students, with specific goals in all content areas.

Coherent

The Core has been designed so that, wherever possible, the ideas taught within a particular grade level have a logical and natural connection with each other and with those of earlier grades. Efforts have also been made to select topics and skills that integrate well with one another appropriate to grade level. In addition, there is an upward articulation of concepts, skills, and content. This spiraling is intended to prepare students to understand and use more complex concepts and skills as they advance through the learning process.

Developmentally Appropriate

The Core takes into account the psychological and social readiness of students. It builds from concrete experiences to more abstract understandings. The Core focuses on providing experiences with concepts that students can explore and understand in depth to build the foundation for future learning experiences.

Reflective of Successful Teaching Practices

Learning through play, movement, and adventure is critical to the early development of the mind and body. The Core emphasizes student exploration. The Kindergarten, First, and Second Grade Intended Learning Outcomes are central in each standard. The Core is designed to encourage instruction with students working in cooperative groups. Instruction should recognize the importance of each Core area in the classroom, school, and community.

Comprehensive

The Kindergarten, First, and Second Grade Core does not cover all topics that have traditionally been in the Kindergarten, First, and Second Grade curriculum; however, it provides a basic foundation of knowledge and skills in all content areas. By emphasizing depth

• By emphasizing depth rather than breadth, the Core seeks to empower students.

• Student achievement of the standards and objectives in this Core is best assessed using a variety of assessment

instruments.

rather than breadth, the Core seeks to empower students rather than intimidate them with a collection of isolated and eminently forgettable facts. Teachers are free to add related concepts and skills, but they are expected to teach all the standards and objectives specified in the Core for their grade level.

Feasible

Teachers and others who are familiar with Utah students, classrooms, teachers, and schools have designed the Core. It can be taught with easily obtained resources and materials. A Teacher Handbook is also available for teachers and has sample lessons on each topic for each grade level. The Teacher Handbook is a document that will grow as teachers add exemplary lessons aligned with the new Core.

Useful and Relevant

This curriculum relates directly to student needs and interests. Relevance of content areas to other endeavors enables students to transfer skills gained from one area of instruction into their other school subjects and into their lives outside the classroom.

Reliant Upon Effective Assessment Practices

Student achievement of the standards and objectives in this Core is best assessed using a variety of assessment instruments. Performance tests are particularly appropriate to evaluate student mastery of thinking processes and problem-solving skills. A variety of classroom assessment approaches should be used by teachers in conjunction with the Criterion Referenced Tests (CRT) that are administered to first and second grade students in Language Arts and Mathematics, and with the pre- and post-tests administered in kindergarten. Observation of students engaged in instructional activities is highly recommended as a way to assess students' skills as well as attitudes toward learning. The nature of the questions posed by students provides important evidence of their understanding.

Engaging

In the early grades, children are forming attitudes and habits for learning. It is important that instruction maximizes students' potential and gives them understanding of the intertwined nature of learning. Effective elementary instruction engages students actively in enjoyable learning experiences. Instruction should be as thrilling an experience for a child as seeing a rainbow, growing a flower, or describing a toad. In a world of rapidly expanding knowledge and technology, all students must gain the skills they will need to understand and function responsibly and successfully in the world. The Core provides skills in a context that enables students to experience the joy of learning.

The Second Grade Core Curriculum

Second grade core concepts should be integrated across all curriculum areas. Reading, writing, and mathematical skills should be emphasized as integral to the instruction in all other areas. Personal relevance of content is always an important part of helping students to value learning and should be emphasized.

In second grade, students are immersed in a literature-rich environment, filled with classical and contemporary fiction and nonfiction selections, which relate to all areas of learning and interest. Students listen and speak effectively in classroom discussions. They continue to work on fluency and expression and use a combination of strategies for reading and comprehension.

Second graders extend their study of number and spatial sense to include three-digit numbers students understand place value and number relationships in addition and subtraction and they model simple concepts of multiplication and division. They measure quantities with appropriate units. They classify shapes and see relationships among them by paying attention to their geometric attributes. They collect and analyze data and verify the answers.

In second grade, students learn about their relationship to the classroom, school, family, and community. Students develop the skills of questioning, gathering information, constructing explanations, and drawing conclusions. They learn basic body control while developing motor skills and moving in a variety of settings. Students become aware of strength, endurance, and flexibility in different parts of their bodies. They express thoughts and ideas creatively, while challenging their imagination, fostering reflective thinking, and developing disciplined effort and problem-solving skills.

 Reading, writing, and mathematical skills should be emphasized as integral to the instruction in all other areas.



K-2 Intended Learning Outcomes

• Intended learning outcomes provide a direction for general classroom instruction, management, culture, environment, and inclusion.

The main intent at the early grades is for students to value learning and develop the skills to gain knowledge and understand their world.

The Intended Learning Outcomes described below reflect the belief that kindergarten, first, and second grade education should address the intellectual, social, emotional, physical, and ethical development of children. While the Kindergarten, First, and Second Grade Core Curriculum focuses primarily on content and the intellectual development of children, it is important to create a classroom culture that fosters development of many aspects of a person. By nurturing development in these interrelated human domains, young people will be healthy and discover varied and exciting talents and dreams. They will be socially and civically competent and able to express themselves effectively.

The outcomes identified below are to provide a direction for general classroom instruction, management, culture, environment, and inclusion. These outcomes should be interwoven throughout the Kindergarten, First, and Second Grade Core Curriculum, which offers more specific and measurable standards for instruction.

Beginning in kindergarten and by the end of second grade students will be able to:

1. Demonstrate a positive learning attitude.

- a. Display a sense of curiosity.
- b. Practice personal responsibility for learning.
- c. Demonstrate persistence in completing tasks.
- d. Apply prior knowledge and processes to construct new knowledge.
- e. Voluntarily use a variety of resources to investigate topics of interest.

2. Develop social skills and ethical responsibility.

- a. Respect similarities and differences in others.
- b. Treat others with kindness and fairness.
- c. Follow classroom and school rules.
- d. Include others in learning and play activities.
- e. Participate with others when making decisions and solving problems.
- f. Function positively as a member of a family, class, school, and community.



3. Demonstrate responsible emotional and cognitive behaviors.

- a. Recognize own values, talents, and skills.
- b. Express self in positive ways.
- c. Demonstrate aesthetic awareness.
- d. Demonstrate appropriate behavior.
- e. Express feelings appropriately.
- f. Meet and respect needs of self and others.

4. Develop physical skills and personal hygiene.

- a. Respect physical similarities and differences in self and others.
- b. Learn proper care of the body for health and fitness.
- c. Develop knowledge that enhances participation in physical activities.
- d. Display persistence in learning motor skills and developing fitness.
- e. Use physical activity for self-expression.

5. Understand and use basic concepts and skills.

- a. Develop phonological and phonemic awareness.
- b. Decode, read, and comprehend written text and symbols.
- c. Develop vocabulary.
- d. Develop reasoning and sequencing skills.
- e. Demonstrate problem-solving skills.
- f. Observe, sort, and classify objects.
- g. Make and interpret representations, graphs, and models.
- h. Recognize how content ideas interconnect.
- i. Make connections from content areas to application in real life.

6. Communicate clearly in oral, artistic, written, and nonverbal form.

- a. Share ideas using communication skills.
- b. Predict an event or outcome based on evidence.
- c. Use appropriate language to describe events, objects, people, ideas, and emotions.
- d. Listen attentively and respond to communication.
- e. Use mathematical concepts to communicate ideas.
- f. Use visual art, dance, drama, and music to communicate.

Second Grade Language Arts Core Curriculum

Standard I:

Oral Language— Students develop language for the purpose of effectively communicating through listening, speaking, viewing, and presenting. Standard I: Oral Language—Students develop language for the purpose of effectively communicating through

listening, speaking, viewing, and presenting.

Objective 1: Develop language through listening and speaking.

Identify specific purpose(s) for listening (e.g., to gain

information, to be entertained).

a. Listen and demonstrate understanding by responding appropriately (e.g., follow multiple-step directions, restate, clarify, question, summarize).

- b. Speak clearly and audibly with expression in communicating ideas.
- c. Speak in complete sentences with appropriate subject-verb agreement.

Objective 2: Develop language through viewing media and presenting.

- a. Identify specific purpose(s) for viewing media (i.e., to identify main idea and details, to gain information, distinguish between fiction/nonfiction).
- b. Use a variety of formats (e.g., drama, sharing of books and personal writings, choral readings, informational reports, retelling experiences, and stories in sequence) in presenting with various forms of media (e.g., pictures, posters, charts, ads, newspapers).

Standard II: Concepts of Print—Students develop an understanding of how printed language works.

Objective 1: Demonstrate an understanding that print carries "the" message.

- a. Recognize that print carries different messages.
- b. Identify messages in common environmental print (e.g., signs, boxes, wrappers).

Objective 2: Demonstrate knowledge of elements of print within a text.

- a. Discriminate between letters, words, and sentences in text.
- b. Match oral words to printed words while reading.
- c. Identify punctuation in text (i.e., periods, question marks, and exclamation points).

Standard II:

Concepts of Print— Students develop an understanding of how printed language works.



Standard III: Phonological and Phonemic Awareness— Students develop phonological and phonemic awareness.

Standard III: Phonological and Phonemic Awareness—Students develop phonological and phonemic awareness.

Objective 1: Demonstrate phonological awareness.

- a. Count the number of syllables in words.
- b. Count the number of syllables in a first name.

Objective 2: Recognize like and unlike word parts (oddity tasks).

- a. Identify words with same beginning consonant sounds (e.g., man, sat, sick) and ending consonant sounds (e.g., man, sat, ten) in a series of words.
- b. Identify words with same medial sounds in a series of words (e.g., long vowel sound: take, late, feet; short vowel sound: top, cat, pan; middle consonant sound: kitten, missing, lesson).

Objective 3: Orally blend word parts (blending).

- a. Blend syllables to make words (e.g., /ta/.../ble/, table).
- b. Blend onset and rime to make words (e.g., /p/.../an/, pan).
- c. Blend individual phonemes to make words (e.g., /s/ /a/ /t/, sat).

Objective 4: Orally segment words into word parts (segmenting).

- a. Segment words into syllables (e.g., table, /ta/.../ble/).
- b. Segment words into onset and rime (e.g., pan, /p/.../an/).
- c. Segment words into individual phonemes (e.g., sat, /s/.../a/.../t/).

Objective 5: Orally manipulate phonemes in words and syllables (manipulation).

- a. Substitute initial and final sound (e.g., replace first sound in mat to /s/, say sat; replace last sound in mat with /p/, say map).
- b. Substitute vowel in words (e.g., replace middle sound in map to /o/, say mop).
- c. Delete syllable in words (e.g., say baker without the /ba/, say ker).
- d. Deletes initial and final sounds in words (e.g., say sun without the /s/, say un; say hit without the /t/, say hi).
- e. Delete initial phoneme and final phoneme in blends (e.g., say step without the /s/, say tep; say best without the /t/, say bes).

Standard IV: Phonics and Spelling—Students use phonics and other strategies to decode and spell unfamiliar words while reading and writing.

Objective 1: Demonstrate an understanding of the relationship between letters and sounds.

- a. Identify and pronounce all vowel diphthongs (e.g., oi, oy, aw, au) and consonant digraphs (e.g., ch, sh, th, wh) accurately in words.
- b. Identify and pronounce sounds for short and long vowels, using patterns (e.g., cvc, cvvc, cvcv, cvc-silent e), and vowel digraphs (e.g., ea, ee, ie, oa, ai, ay, oo, ow) accurately in two-syllable words.
- c. Identify and pronounce r-controlled vowel patterns in words (e.g., ar, or, er).
- d. Identify and blend letter sounds to pronounce words.

Objective 2: Use knowledge of structural analysis to decode words.

- a. Identify and read grade level contractions and compound words.
- b. Identify sound patterns and apply knowledge to decode words (e.g., blends, digraphs, vowel patterns, r-controlled vowels).
- c. Demonstrate an understanding of representing the same sound with different patterns by decoding these patterns accurately in isolation and in text (e.g., ee, ea, ei, e).
- d. Use knowledge of root words and prefixes (e.g., re, un, mis) and suffixes (e.g., s, es, ed, ing, est, ly) to decode words.
- e. Use letter and syllable patterns to pronounce multisyllabic words.

Objective 3: Spell words correctly.

- a. Use knowledge of word families, patterns, and common letter combinations to spell new words.
- b. Spell words with short and long vowel sounds, r-controlled words, words with consonant blends, consonant and vowel digraphs.
- c. Spell an increasing number of grade level high-frequency and irregular words correctly (e.g., believe, answer).
- d. Learn the spellings of irregular and difficult words (e.g., because, animals, before, answer, weight).

Standard IV:
Phonics and
Spelling—Students
use phonics and
other strategies to
decode and spell
unfamiliar words
while reading and
writing.

Objective 4: Use spelling strategies to achieve accuracy (e.g., prediction, visualization, and association).

- a. Use knowledge about spelling to predict the spelling of new words.
- b. Visualize words while writing.
- c. Associate the spelling of new words with that of known words and word patterns.
- d. Use spelling generalities to assist spelling of new words (e.g., one vowel between two consonants, silent "e" on the end of a word, two vowels together).



Standard V: Fluency—Students develop reading fluency to read aloud grade level text effortlessly without hesitation.

Objective 1: Read aloud grade level text with appropriate speed and accuracy.

- a. Read grade level text at a rate of approximately 80 wpm.
- b. Read grade level text with an accuracy rate of 95-100%.

Objective 2: Read aloud grade level text effortlessly with clarity.

- a. Read grade level text in three- to four-word phrases using intonation, expression, and punctuation cues.
- b. Read with automaticity 200 second grade high-frequency/ sight words.

Standard V:

Fluency—Students develop reading fluency to read aloud grade level text effortlessly without hesitation.

Standard VI:
Vocabulary—
Students learn
and use grade
level vocabulary
to increase
understanding and
read fluently.

Standard VI: Vocabulary—Students learn and use grade level vocabulary to increase understanding and read fluently.

- Objective 1: Learn new words through listening and reading widely.
 - a. Use new vocabulary learned by listening, reading, and discussing a variety of genres.
 - b. Learn the meaning of a variety of grade level words (e.g., words from literature, social studies, science, math).
- Objective 2: Use multiple resources to learn new words by relating them to known words and/or concepts.
 - a. Use multiple resources to determine the meanings of unknown words (e.g., simple dictionaries, glossaries).
 - b. Relate unfamiliar words and concepts to prior knowledge to increase vocabulary (e.g., liquid: milk, water, punch).
- Objective 3: Use structural analysis and context clues to determine meanings of words.
 - a. Identify meanings of words using prefixes and suffixes (e.g., do/undo, write/rewrite, happy/happiness, help/helper/helpful).
 - b. Use context to determine meanings of unknown key words (e.g., The store clerk glared at the children as they looked at the toys.).
 - c. Use context to determine meanings of synonyms, antonyms, homonyms (e.g., sun/son) and multiple-meaning words (e.g., ring).

Standard VII: Comprehension—Students understand, interpret, and analyze narrative and informational grade level text.

Objective 1: Identify purposes of text.

- a. Identify purpose for reading.
- b. Identify author's purpose.

Objective 2: Apply strategies to comprehend text.

- a. Relate prior knowledge to make connections to text (e.g., text to text, text to self, text to world).
- b. Ask questions about text read aloud and independently.
- c. Form mental pictures to aid understanding of text.
- d. Make and confirm predictions while reading using title, picture clues, text, and/or prior knowledge.
- e. Make inferences and draw conclusions from text.
- f. Identify topic/main idea from text; note details.
- g. Summarize important ideas/events; summarize supporting details in sequence.
- h. Monitor and clarify understanding applying fix-up strategies while interacting with text.
- i. Compile information from text.

Objective 3: Recognize and use features of narrative and informational text.

- a. Identify characters, setting, sequence of events, problem/resolution.
- b. Identify different genres: fairy tales, poems, realistic fiction, fantasy, fables, folk tales.
- c. Identify information from pictures, captions, diagrams, charts, graphs, and table of contents.
- d. Identify different structures in texts (e.g., compare/contrast, cause/effect).
- e. Locate facts from a variety of informational texts (e.g. newspapers, magazines, books, other resources).

Standard VII:
Comprehension—
Students understand, interpret, and analyze narrative and informational grade level text.

Standard VIII: Writing—Students write daily to communicate effectively for a variety of purposes and audiences.

Standard VIII: Writing—Students write daily to communicate effectively for a variety of purposes and audiences.

Objective 1: Prepare to write by gathering and organizing information and ideas (pre-writing).

- a. Generate ideas for writing by reading, discussing literature and informational text, and reflecting on personal experiences.
- b. Select topics from generated ideas.
- c. Identify audience, purpose, and form for writing.
- d. Use simple graphic organizers to organize information.

Objective 2: Compose a written draft.

- a. Draft ideas on paper in an organized manner utilizing words and sentences (e.g., beginning, middle, end; main idea; details).
- b. Use voice in writing (e.g., express feelings, opinions).
- c. Select appropriate words to convey meaning.

Objective 3: Revise by elaborating and clarifying a written draft.

- a. Revise draft to add details, strengthen word choice, and reorder content.
- b. Enhance fluency by using complete sentences.
- c. Revise writing, considering the suggestions of others.

Objective 4: Edit written draft for conventions.

- a. Edit writing for capitals in names, first word of a sentence, and the pronoun "I", correct punctuation of sentence endings, greetings and closings of letters, dates, and contractions.
- b. Edit for spelling of grade-level appropriate words.
- c. Edit for standard grammar (e.g., subject-verb agreement).
- d. Edit for appropriate formatting features (e.g., margins, indentations, titles).

Objective 5: Use fluent and legible handwriting to communicate.

- a. Write demonstrating mastery of all upper- and lower-case manuscript letters and numerals using proper form, proportions, and spacing.
- b. Increase fluency in forming manuscript letters and numerals.
- c. Produce legible documents with manuscript handwriting.

Objective 6: Write in different modes and genres.

- a. Produce personal writing (e.g., journals, friendly notes and letters, personal experiences, family stories, literature responses).
- b. Produce traditional and imaginative stories, narrative and formula poetry as an individual/shared writing activity.
- c. Produce informational text (e.g., ABC books, how-to books, observations).
- d. Produce writing to persuade (e.g., express opinions).
- e. Produce functional texts (e.g., lists, labels, signs).
- f. Share writing with others using illustrations, graphs, and/or charts to add meaning.
- g. Publish four to six individual products.

Second Grade Mathematics Core Curriculum

Standard I:
Students will acquire number sense with whole numbers and fractions and perform operations with whole numbers.

By the end of grade two, students understand place value and number relationships in addition and subtraction and they model simple concepts of multiplication and division. They measure quantities with appropriate units. They classify shapes and see relationships among them by paying attention to their geometric attributes. They collect and analyze data and verify the answers.

Standard I: Students will acquire number sense with whole numbers and fractions and perform operations with whole numbers.

- Objective 1: Identify and represent the relationships among numbers, quantities, and place value in whole numbers up to 1000.
 - a. Represent whole numbers in groups of hundreds, tens, and ones using base ten models and write the numeral representing the set in standard and expanded form.
 - b. Identify the place and the value of a given digit in a three-digit numeral.
 - c. Represent the composition and decomposition of numbers in a variety of ways.
 - d. Compare and order numbers using the terms, greater than, less than, or equal to, and the symbols, >, <, and =, using various strategies, including the number line.
 - e. Identify and describe even and odd whole numbers.
- Objective 2: Use unit fractions to identify parts of the whole and parts of a set.
 - a. Divide geometric shapes into two, three, or four equal parts and identify the parts as halves, thirds, or fourths.
 - b. Divide sets of objects into two, three, or four parts of equal number of objects and identify the parts as halves, thirds, or fourths.
 - c. Represent the unit fractions 1/2, 1/3, and 1/4 with objects, pictures, words (e.g., ___out of ___ equal parts), and symbols.
- Objective 3: Estimate, model, illustrate, describe, and solve problems involving two- and three-digit addition and subtraction.

- a. Demonstrate quick recall of addition facts (up to 10 + 10) and related subtraction facts.
- b. Model addition and subtraction of two- and three-digit whole numbers (sums and minuends to 1000) in a variety of ways.
- c. Write a story problem that relates to a given addition or subtraction equation, and write a number sentence to solve a story problem that is related to the environment.
- d. Demonstrate fluency with two- and three-digit addition and subtraction problems, using efficient, accurate, and generalizable strategies that include standard algorithms and mental arithmetic, and describe why the procedures work.
- e. Use the mathematical relationship between addition and subtraction and properties of addition to model and solve problems.

Objective 4: Model, illustrate, and pictorially record solutions to simple multiplication and division problems.

- a. Represent multiplication with equal groups using concrete objects and skip counting by twos, fives, and tens.
- b. Represent division as fair shares using concrete objects or pictures.

Mathematical language and symbols students should use:

number line, add, sum, subtract, difference, greater than, less than, equal to, >, <, =, even, odd, halves, thirds, fourths, 1/2, 1/3, 1/4.

Exploratory Concepts and Skills

- Investigate addition of common fractions (e.g., 1/2 + 1/2 = 1, 1/4 + 1/4 = 1/2).
- Investigate comparing fractions in terms of greater than, less than, and equal to.
- Understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally.



Standard II:
Students will identify and use patterns and relations to represent mathematical situations.

Standard II: Students will model, represent, and interpret patterns and number relationships to create and solve problems with addition and subtraction.

- Objective 1: Recognize, describe, create, and extend growing patterns.
 - a. Determine the next term in linear patterns (e.g., 2, 4, 6...; the number of hands on one person, two people, three people).
 - b. Construct models and skip count by twos, threes, fives, and tens and relate to repeated addition.
- Objective 2: Model, represent, and interpret number relationships using mathematical symbols.
 - a. Recognize that "≠" indicates a relationship in which the two sides of the inequality are expressions of different numbers.
 - b. Recognize that symbols such as *X*, r, or ⁻ in an addition or subtraction equation represent a number that will make the statement true.
 - c. Use the commutative and associative properties of addition to simplify calculations.

Mathematical language and symbols students should use: patterns, +, -, =, ≠

Exploratory Concepts and Skills

• Investigate situations with variables as unknowns and as quantities that vary.

Standard III: Students will understand simple geometry and measurement concepts as well as collect, represent, and draw conclusions from data.

Objective 1: Describe, classify, and create geometric figures.

- a. Describe and classify plane and solid geometric figures (i.e., circle, triangle, rectangle, square, trapezoid, rhombus, parallelogram, pentagon, hexagon, cube, sphere, cone) according to the number of sides and angles or faces, edges, and vertices.
- b. Compose and decompose shapes and figures by substituting arrangements of smaller shapes for larger shapes or substituting larger shapes for arrangements of smaller shapes.
- c. Compose and decompose shapes and figures and describe the part-whole relationships, similarities, and differences.

Objective 2: Identify and use units of measure, iterate (repeat) that unit, and compare the number of iterations to the item being measured.

- a. Identify and use measurement units to measure, to the nearest unit, length (i.e., inch, centimeter), weight in pounds, and capacity in cups.
- b. Estimate and measure length by iterating a nonstandard or standard unit of measure.
- c. Use different units to measure the length of the same object and recognize that the smaller the unit, the more iterations needed to cover a given length.
- d. Determine the value of a set of up to five coins that total \$1.00 or less (e.g., three dimes, one nickel, and one penny equals 36¢).
- e. Tell time to the quarter-hour and sequence a series of daily events by time (e.g., breakfast at 7:00 a.m., school begins at 9:00 a.m, school ends at 3:00 p.m.).

Objective 3: Collect, record, organize, display, and interpret numerical data.

- a. Collect and record data systematically, using a strategy for keeping track of what has been counted.
- b. Organize and represent the same data in more than one way.

Standard III:
Students will
understand simple
geometry and
measurement
concepts as
well as collect,
represent, and draw
conclusions from

data.

- c. Organize, display, and label information, including keys, using pictographs, tallies, bar graphs, and organized tables.
- d. Describe data represented on charts and graphs and answer simple questions related to data representations.

Mathematical language and symbols students should use:

inch, centimeter, pound, cup, circle, triangle, rectangle, square, trapezoid, rhombus, parallelogram, pentagon, hexagon, cube, sphere, cone, vertices, angle, face, edge, weight, length, capacity

Exploratory Concepts and Skills

- Use verbal instructions to move within the environment.
- Determine simple equivalencies of measurements.
- Conduct simple probability experiments.

Second Grade Fine Arts, Health, Physical Education, Science and Social Studies Core Curriculum

Standard I: Students will develop a sense of self.

Objective 1: Describe and adopt behaviors for health and safety.

- a. Explain the importance of balance in a diet.
- b. Distinguish communicable from noncommunicable diseases (e.g., chicken pox, common cold, flu; asthma, cancer, diabetes).
- c. Relate behaviors that can help prevent disease (e.g., hand washing, good nutrition, fitness, universal precautions).
- d. Identify the harmful effects of tobacco on self and others (e.g., death, heart and lung disease, shortness of breath).
- e. Adopt basic safety habits (e.g., wear a seatbelt, practice bicycle safety, find adult help in an emergency).

Objective 2: Develop and apply skills in fine and gross motor movement.

- a. Participate daily in sustained periods of physical activity that requires exertion (e.g., one to five* minutes of walking, jogging, jump roping).
- b. Perform fundamental locomotor and nonlocomotor skills in movement sequences and game applications (e.g., walk-hop-skip, run-stretch-skate, run-hop-lay up).
- c. Perform manipulative skills exhibiting a majority of correct technique components (e.g., soccer kick: eyes on ball, step with foot opposite to kicking foot, contact ball with inside of foot, follow through).
- d. Identify components of physical fitness (i.e., strength, endurance, flexibility) and corresponding activities.
- e. Create and perform unique dance movements and sequences that expand physical skills while demonstrating personal and spatial awareness.

Objective 3: Develop and use skills to communicate ideas, information, and feelings.

a. Express personal experiences and imagination through dance, storytelling, music, and visual art.

Standard I: Students will develop a sense of self.

- b. Create, with improving accuracy, works of art depicting depth (e.g., close objects large, distant objects small) using secondary and tertiary colors.
- c. Develop ability to sing in tune with relaxed strength and clarity.
- d. Develop consistency in rhythmic accuracy of body percussion and instrument playing.
- * Some students may not be able to sustain activity for one minute due to various medical concerns.



Standard II: Students will develop a sense of self in relation to families and community.

Objective 1: Describe behaviors that influence relationships with family and friends.

- a. Describe characteristics of healthy relationships (e.g., caring, responsibility, trust, respect).
- b. Identify benefits of cooperating and sharing.
- c. Explain how families and communities change over time.
- d. Recognize how choices and consequences affect self, peers, and family.
- e. Identify behaviors that might create conflict situations and ways to resolve them.

Objective 2: Examine important aspects of the community and culture that strengthen relationships.

- a. Explain why families, schools, and communities have rules.
- b. Compare rural, suburban, and urban communities.
- c. Relate goods and services to resources within the community.
- d. Participate in activities that promote public good (e.g., respect cultural and ethnic differences, identify community needs) and recite the Pledge of Allegiance.
- e. Recognize the positive and negative impact of media.

Objective 3: Express relationships in a variety of ways.

- a. Describe traditions, music, dances, artwork, poems, rhymes, and stories that distinguish cultures.
- b. Develop an acting ability to relate to characters' thoughts and feelings (e.g., needs, hopes, frustrations, fears) in stories and plays.
- c. Create and perform/exhibit dances, visual art, music, and dramatic stories from a variety of cultures expressing the relationship between people and their culture.

Standard II:
Students will
develop a sense
of self in relation
to families and
community.

Standard III:
Students will
develop an
understanding of
their environment.

Standard III: Students will develop an understanding of their environment.

- Objective 1: Investigate relationships between plants and animals and how living things change during their lives.
 - a. Observe and describe relationships between plants and animals.
 - b. Describe the life cycle of local plants and animals using diagrams and pictures.
 - c. Create pictures and stories about real animals and compare them to make-believe stories about animals.

Objective 2: Observe and describe weather.

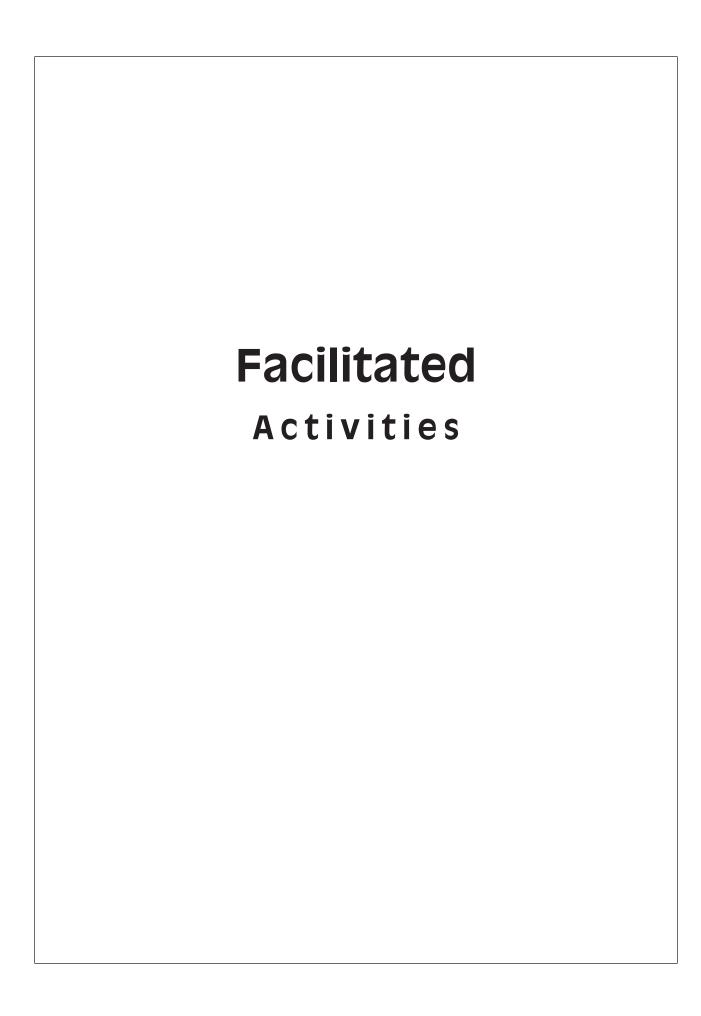
- a. Observe and describe patterns of change in weather.
- b. Measure, record, graph, and report changes in local weather.
- c. Describe how weather affects people and animals.
- d. Draw pictures and create dances and sounds that represent weather features (e.g., clouds, storms, snowfall).

Objective 3: Investigate the properties and uses of rocks.

- a. Describe rocks in terms of the parts that make up the rocks.
- b. Sort rocks based upon color, hardness, texture, layering, and particle size.
- c. Identify how the properties of rocks determine how people use them.
- d. Create artworks using rocks and rock products.

Objective 4: Demonstrate how symbols and models are used to represent features of the environment.

- a. Identify and use information on a map or globe (i.e., map key or legend, compass rose, physical features, continents, oceans).
- b. Use an atlas and globe to locate information.
- c. Locate continents and oceans on a map or globe (i.e., North America, Antarctica, Australia, Africa, Pacific Ocean, Atlantic Ocean).



New Math Core Curriculum Elementary CORE Academy 2007

Since the 2003 adoption of Utah's Elementary Mathematics Core Curriculum, ideas such as coherence, focus, high expectations, computational fluency, representation, and important mathematics have become regular elements in discussions about improving school mathematics. As the next step in devising resources to support the development of a coherent curriculum, the National Council of Teachers of Mathematics (NCTM) released *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics: A Quest for Coherence*.

With NCTM's release of the Curriculum Focal Points and discussion regarding high expectations, it became important for Utah to revise the Elementary Mathematics Core Curriculum. The placement of concepts within the Curriculum Focal Points guided the placement of concepts within Utah's Core.

ELEMENTARY

CORE Academy

The Core has also been designed so that, wherever possible, the ideas taught within a particular grade level have a logical and natural connection with each other and with those of earlier grades. Efforts have also been made to select topics and skills that integrate well with one another and with other subject areas appropriate to grade level. In addition, there is an upward articulation of mathematical concepts and skills. This spiraling is intended to prepare students to understand and use more complex mathematical concepts and skills as they advance through the learning process.

The Core takes into account the psychological and social readiness of students. It builds from concrete experiences to more abstract understandings. The Core focuses on experiences with concepts that students can explore and understand in depth to build the foundation for future mathematical learning experiences.

The Elementary Mathematics Core describes what students should know and be able to do at the end of each of the K-6 grade levels. It was developed and revised by a community of Utah mathematics teachers, mathematicians, university mathematics educators, and State Office of Education specialists. It was critiqued by an advisory committee representing a wide variety of people from the community, as well as an external review committee. The Core reflects the current philosophy of mathematics education that is expressed in national documents developed by the National Council of Teachers of Mathematics, the American Association for the Advancement of Science, and the National Research Council. This Mathematics Core has the endorsement of the Utah Council of Teachers of Mathematics. The Core reflects high standards of achievement in mathematics for all students.



Each day good educators observe and interact with students to determine what course of action should be taken to achieve the best educational results for each learner. These observations, in many instances, are made with limited formal data. The E-D-P Model assists educators in the collection and use of information justifying implementation of practices. Many educators struggle with the ability to articulate and align teaching actions with student learning needs. The E-D-P Model is a method of aiding this articulation.

When assessing, it is important to know that correct answers do not necessarily mean students understand a concept. Conversely, incorrect responses may not indicate that a student hasn't learned a concept. It is important for educators to look for hidden understandings and possible misconceptions. Ongoing assessments, observations, and interviews may be necessary. When using this process, instructors should select assignments/tasks where students have opportunities to explain their understanding. Developing a tool to aid teachers in the collection of information and to assist them in determining student understanding has been the driving force in creating the E-D-P Model.

Our discussion begins with a description of the E-D-P Model. This model is based on a medical metaphor of Evaluation-Diagnosis-Prescription (E-D-P). It is important to understand the difference between three main types of assessment: diagnostic (usually occurring prior to instruction), formative (concurrently occurs with instruction), and summative (occurs at the conclusion of an instructional period). The E-D-P Model targets diagnostic and formative assessments. By conducting ongoing assessments and using this formative information, educators can effectively impact student learning and plan instruction to meet individual learning needs (McNamee & Chen, 2005).

Evaluation

In classrooms across the country one may observe teachers interacting with students in a variety of ways. The Evaluation portion of the E-D-P Model provides teachers with a way to identify student learning as it relates to the standard and objective of instruction. As a teacher sees a particular student response she is able to identify understandings and misunderstandings.

EXAMPLE: Marcia responded with the answer of 12 when she was asked to add 14 and 8. Using Marcia's work, an instructor sees that Marcia needs instruction on renaming. Other conclusions for the same response may also be apparent. The Evaluation phase can then transition to the Diagnosis.

Diagnosis

As the student response is investigated the instructor may need to ask questions or inquire regarding the reasoning used to formulate the response. This is similar to a physician, where if a pain in the abdomen is described, the doctor poses questions to the patient or performs a physical exam to determine the source of pain. Educators can employ a similar method as they determine the cause of the incorrect responses given by a student. The diagnosis may consume large amounts of time or be rapidly identified based on student work.

Prescription

Once a learning need is Diagnosed/identified, renaming in the case of our example, the teacher can then determine what Prescriptive action should be taken. In the medical profession, the instructor or doctor has multiple medicines or treatments that can be prescribed. These multiple medicines affect individuals in different ways based on body chemistry and make up. This is also true with education in relation to learning styles. In education, teachers should have multiple activities, learning situations, or practice methods that can be prescribed to help students understand. In our example the teacher could prescribe numerous interventions to help our student understand the renaming concept. (e.g., place value practice, peer discussion groups focused on a single problem, one-on-one discussion about place value, manipulative extensions, etc.)

As teachers formalize the work that is done in a classroom they will be able to define the learning that occurs in a classroom and what learning should take place in the future. There can be a fine line between instruction and assessment when educators use quality formative assessment tasks to guide instruction and learning (Leahy, et al., 2005). The E-D-P Model encourages teachers to evaluate student work, diagnose learning needs, and determine the best prescription for continued growth in knowledge. Some teachers complete these three stages daily in classrooms around the nation without defining the process. This model provides educators a method to formalize current practice and aid them in the implementation process.

Citations

Leahy, S., Lyon, C., Thompson, M., Wiliam, D. (November 2005). Classroom Assessment: Minute by Minute, Day by Day. *Educational Leadership*, 63:3, p.18-24.

McNamee, G.D., Chen, J.Q. (November 2005). Dissolving the Line Between Assessment and Teaching. *Educational Leadership*, 63:3, p.72-76.

Medical Metaphor T-Chart						
Physician	Educator					
Why would a physician complete an Evaluation?	Why would an educator complete an Evaluation?					
What would a physician use to make make a medical diagnosis?	What would an educator use to make a learning diagnosis?					
When evaluation and diagnosis are complete what kind of prescription would be given?	When evaluation and diagnosis are complete what kind of prescription would be given?					

CORE Academy E-D-P Assessment Form			CORE Academy E-D-P Assessment Form					
Evaluation:			Evaluation:					
Name			Name					
Date			Date					
Task/Objective			Task/Objective					
() Individual () Pa	rtner () Gi	roup	() Individual () P					
Diagnosis:			Diagnosis:					
1)	Strengths	Weakness	1)	Strengths	Weakness			
1)			1) 2)					
2)			3)					
4)			4)					
5)			5)					
6)			6)					
Prescription:			Prescription:					
CORE Academy			ELEMENTARY CORE ACADEMY					
E-D-P	Assessment 1	Form	E-D-P	Assessment	Form			
E-D-P Evaluation:	Assessment 1		E-D-P Evaluation:	Assessment				
<u>E-D-P</u>			<u>E-D-P</u>					
E-D-P Evaluation:			Evaluation:					
E-D-P Evaluation: Name Date			E-D-P Evaluation: Name Date					
E-D-P Evaluation:			E-D-P Evaluation: Name					
E-D-P Evaluation: Name Date Task/Objective	rtner () Gi		E-D-P Evaluation: Name Date Task/Objective					
E-D-P Evaluation: Name Date Task/Objective () Individual () Pa Diagnosis:			E-D-P Evaluation: Name Date Task/Objective () Individual () P Diagnosis:					
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E-D-P Evaluation: Name Date Task/Objective () Individual () Pa Diagnosis:	rtner () Gi	roup	E-D-P Evaluation: Name Date Task/Objective () Individual () P Diagnosis:	artner () G	roup			
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E-D-P Evaluation: Name Date Task/Objective () Individual () Pa Diagnosis: 1) 2) 3) 4) 5) 6)	rtner () Gi	roup	E-D-P Evaluation: Name Date Task/Objective () Individual () P Diagnosis: 1) 2) 3) 4) 5) 6)	artner () G	roup			
E-D-P Evaluation: Name Date Task/Objective () Individual () Pa Diagnosis: 1) 2) 3) 4) 5)	rtner () Gi	roup	E-D-P Evaluation: Name Date Task/Objective () Individual () P Diagnosis: 1) 2) 3) 4) 5)	artner () G	roup			

CORE Academy E-D-P Assessment Form

Evaluation:										
Students:	Dia	gnos	sis:			Pr	Prescription:			
Task:	Communication	Representation	Computation			Task #4	Comp. #6	Assignment #1		
1) Kyler	√-	√	√			X				
2) Jose	√	√ +	√-					X		
3) Kyler	√+	√ +	√+				X			
4) Sammy	V	√	√-					X		
5) Shelby	√-	√-	√-					X		



E-D-P Assessment Form	
Diagnosis:	Prescription:

CORE Academy E-D-P Assessment Form

Evaluation:										
Students:	Dia	gnos	sis:	 		Pr	escri	ptio	n:	
Task:	Communication	Representation	Computation			Task #4	Comp. #6	Assignment #1		
1) Kyler	√-	√	V			X				
2) Jose		√+	√-					X		
3) Kyler	√+	√+	√+				X			
4) Sammy	√	√	√-					X		
5) Shelby	√-	√-	√-					X		

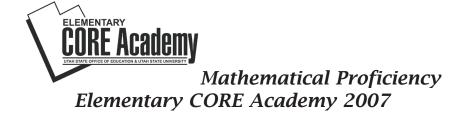
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•	OODE Acadamy
•	THE TRANSPORT
•	OUIL MUDULING
	UTAM STATE OFFICE OF EDUCATION & UTAM STATE UNIVERSITY

E-D-P Assessment Form	
Diagnosis:	Prescription:

^{*}Copy to a label and place on student work.

^{*}Copy to a label and place on student work.

Core Standard & Objective:		ent FOR l (Evaluate)		Assessment of Needs (Diagnosis)								
	Туре	of Assess	ment		Needs Missing Needs Basic Grade Needs Extension Foundational Skills Level Core Skills Core Skills							
	Ε	Pre/ Pates:	Post /	Plan for Instruction (Prescription) Examples: Expicit Instruction using Graphic Org Skill Specific Activities, Guided Practice, etc.					nizers,			
Student Name	Limited Knowledge	Partial Knowledge	Mastery									



How do educators know when a student "Gets It?" Elementary teachers interact with students daily using a variety of individual views regarding mathematical understanding. Success in mathematics is created through a student's composite view and aptitude in five areas of mathematics. In the book, *Helping Children Learn Mathematics*, we are introduced to this composite view of mathematics learning. The term mathematical proficiency is used to describe what it means when a person successfully learns mathematics.

Mathematical proficiency includes five strands:

- 1) Understanding: Comprehending mathematical concepts, operations and relationsknowing what mathematical symbols, diagrams, and procedures mean.
- 2) Computing: Carrying out mathematical procedures, such as adding, subtracting, multiplying, and dividing numbers flexibly, accurately, efficiently, and appropriately.
- 3) Applying: Being able to formulate problems mathematically and to devise strategies for solving them using concepts and procedures appropriately.
- 4) **Reasoning**: Using logic to explain and justify a solution to a problem or to extend from something known to something not yet known.
- 5) Engaging: Seeing mathematics as sensible, useful, and doable-if you work at it-and being willing to do the work.

It is critical to understand that each of these strands is interwoven and interdependent. Various views of success in mathematics emphasize one aspect of mathematical proficiency with the expectation that the other areas of mathematical knowledge will follow. Success in mathematics comes through achieving mathematical proficiency, which includes each of the five strands.

We see parents, students, and educators focus on only one strand of proficiency, which results in memorized facts that do not necessarily lead to mathematical success. This narrow treatment of math does not provide the strong basis of mathematical learning that students need.

As students learn all the aspects of mathematical proficiency, learning will become stronger, more durable, more adaptable, more useful, and more relevant. It is difficult to master any one of these strands in isolation and is therefore essential to teach the strands in an interconnected method. Developing the strands together builds a student's knowledge of any one strand through connected knowledge points that are memorable.

Citation

National Research Council. (2002). Helping Children Learn Mathematics. Mathematics Learning Study Committee, J. Kilpatrick and J. Swafford, Editors. Center for Education, Division of Behavioral and Social Sciences and Education. Washington, D.C.: National Academy Press.

Building Academic Vocabulary Elementary CORE Academy 2007

Teaching students vocabulary that will be encountered during the study of content provides a solid background for a positive interaction with that content. Building academic vocabulary is much more than simply placing words upon a word wall or providing a matching exercise with a definition and new terms.

Initially the selection of the terms to be provided to students takes effort and time. Educators should identify key words that are important to the understanding of specific content areas, and are included in the Core Curriculum. The background work of identifying the terms is critical to providing an accurate direction for the subsequent instruction. However, the key to the success of building academic vocabulary ultimately rests upon the quality of the instruction provided by the teacher. Marzano and Pickering provide the following six-step Process for teaching new terms.

The Six-Step Process for Teaching Academic Vocabulary:

ELEMENTARY

CORE Academy

- 1) Provide a description, explanation, or example of the new term.
- 2) Ask students to restate the description, explanation, or example in their own words.
- 3) Ask students to construct a picture, symbol, or graphic representing the term or phrase.
- 4) Engage students periodically in activities that help them add to their knowledge of the terms in their notebooks.
- 5) Periodically ask students to discuss the terms with one another.
- 6) Involve students periodically in games that allow them to play with the terms.

With guidance and monitoring students have the ability to generate their own description and representations of vocabulary terms provided. The ownership of this process is valuable in that students see the term as a new tool that aids their learning. An integral step in the process of learning new vocabulary is the student notebook. As students add new terms to their notebook they also refine and update descriptions, which deepens and clarifies their understanding of the content and the terms.

Creating a deeper understanding of vocabulary terms will provide students with multiple points of learning as they encounter new content. These points of learning will broaden the knowledge base and allow students to develop an awareness of the language of learning.

Citation

Marzano, R.J., Pickering, D.J., (2005). Building Academic Vocabulary Teachers's Manual ASCD, Alexandria, VA.

Academy Handbook Second Grade

Math I-2 & III-2 Activities

Fractions & Measure

Making \$ents

Standard III:

Students will understand simple geometry and measurement concepts as well as collect and draw conclusions from data.

Objective 2:

Identify and use units of measure, iterate (repeat) that unit, and compare the number of iterations to the item being measured.

Intended Learning Outcomes:

5. Understand and use basic concepts and skills.

Content Connections:

Math II-1 Counting by fives and tens

Math Standard III

Objective 2

Connections

Background Information

Games are a way to review and practice important mathematical concepts while having fun. Games are real world problem solving. They also teach important life skills. Many students lack the opportunity to develop these skills. Many life skills like learning to get along with others, learning to win/lose gracefully, deciding who will go first (decision making), finding winning strategies (logical thinking), learning to follow the rules, and valuing fair play are what can be learned and gained from playing games.

This lesson is made up of several activities that will give students many opportunities to practice and model strategies that help them count money. It is assumed that students will know the names and values of the penny, nickel, dime, and quarter before participating in these activities.

Note: This activity may take two days.

Research Basis

Caine, R.N., & Caine, G. (1994). *Making connections: Teaching and the human brain.* Menlo Park, CA: Addison-Wesley.

Learning from classroom activities with application to real world situations are the lessons students seem to learn from and appreciate the most. Brain research shows the more senses used in instruction, the better learners will be able to remember, retrieve, and connect the information in their memories. "I hear and I forget; I see and I remember; I do and I understand." Students learn best when doing. By incorporating realistic, integrated, or interdisciplinary activities that build on established knowledge and skills and more than one sense, memory pathways become more accessible and cross-referenced for

future use. As teachers discover the most effective strategies for better student achievement, they can adapt their lessons accordingly.

Carpenter, T.P., Frank, M.L., Jacobs, V.R., Fennema, E., & Empson, S.B. (1999). *Children's mathematics: Cognitively guided instruction*, Heinemann, Portsmouth, NH. 28, 41.

Counting strategies follow the mastering of direct modeling strategies and allow the student to develop more into efficient procedures for calculating answers to addition and subtraction problems. Using counting strategies indicates a level of understanding of number concepts and an ability to reflect on numbers as abstract entities, particularly coins. Skip counting is one of the counting strategies that students use when counting coins and locating a sum.

Invitation to Learn

Ask students if they have ever been shopping with their parents. Have they ever peeked over the counter and looked into the cash drawer that comes open when they are ready to pay for their purchases? What do they see? Then discuss how the money is in cash drawer order.

Instructional Procedures



Counting On

- 1. Read the story, *The Penny Pot*, as you read talk about the coins that are used each time and how much they are worth. Give the students each a mixed bag of plastic coins containing pennies, nickels, dimes, and quarters. Have the students put them into cash drawer order. Reread the story and have students pull out coins from their cash drawer to match the story and count them up as a class—as they do in the story
- 2. Talk about if it is necessary to use money in everyday situations. Ask the students if they think it is important to use money in everyday situations. Talk about how the students in the story counted on to know their total.
- 3. Model counting on for the students. Have them help you count on from the coin that is worth the most and count on. Start with a quarter and a dime to show how to count on by tens. Practice with the students as much as necessary until they feel confident at counting on by tens. Next, count a quarter and a nickel to show how to count on by fives. Again, give them additional practice, as you feel necessary. Each student has a bag of coins (each bag has a different collection of coins that

are less than one dollar) and have them sort the coins into cash drawer order. Put on the coin chart to organize. Partner the students up and have them take turns and repeat the process of counting on.

It Makes \$ents to Trade

Part 1

- 1. Group students into pairs.
- 2. Give each student a die, a money bag (or container of coins), and an *It Makes \$ense to Trade Money Chart*.
- 3. The first player rolls the die and takes that many pennies, places them in the pennies column on the money chart, and states how much they have. Players take turns.
- 4. On the next turn, before rolling the die, the player must restate how much money he/she has, roll, take that many more pennies and states the new amount. If he/she can trade up for nickels. Have student recall out loud what amount is being traded and what the amount is being traded for. Make sure the partner checks their work. Play continues trading up when possible until the first player reaches 25 cents. After each pair has met 25 cents, the value to be reached can be changed. The value needed to win can vary up to one dollar depending on the students' ability.

Part 2

- 1. Group students into pairs.
- 2. Give each pair of students a container of coins and a small scoop. Each student needs an *It Makes \$ense to Trade Money Chart*. Have each student scoop out some coins and sort them onto their chart, count up their total amount, and record it on their *It Makes \$ense to Trade Recording Sheet* (their blank sheet of paper). *This can also be done individually*. Students' deposit their scoop back in to the container and get another scoop, repeating the process 10 times for practice.
- 3. After allowing sufficient time for practice, have students scoop out a specified amount such as 53 cents. Observe what coins students have scooped out and comment on different combinations you observed being used. Encourage students to replace their coins with other coins that would make the same amount. Ask if there are any coins that they could trade.

Materials

- ☐ Dice
- ☐ It makes \$ents to Trade Money Chart
- ☐ It makes \$ents to Trade Recording Sheet
- ☐ Small scoops

Option: You could then have students fold a piece of paper in half to make two columns. Have the students scoop out some coins, draw the coins, and write the amount in the first column. Then have the students' trade to make the fewest coins possible to make the same amount. The students draw the new coins in the second column. *This could be used as an assessment.*

Materials

- ☐ Big Buck Adventure
- ☐ Money Wallets filled with coin packets
- ☐ Passing the Buck recording Sheet

Passing the Buck

Passing the Buck can be broken into two or more sessions.

- 1. Read the story, *The BIG BUCK Adventure*. Ask the students what they would buy with a dollar. Discuss what they would like and if they would have enough money. Make a class list of items to buy. Tell the students that they are going to go shopping and are going to need to see if they have enough in their money wallets to buy the necessary items.
- 2. Put students into small groups and give each student a money wallet that contains plastic coin packets adding up to various amounts up to one dollar and a *Passing the Buck Recording Sheet*. Tell the students to count up the money in the wallet and write the total amount on their recording sheet next to the number that is the same as the number written on the money wallets. Have students pass the money wallet to the person on their right. Have them do 10 money wallets.

Variation: Have students compare two wallets and ask questions such as: Which has more? How much more? Can you show that same amount in a different way?

Assessment Suggestions

- To obtain a formal assessment, use the money clips and the recording sheets to see where the students are and help guide your teaching to the differentiated learning that is taking place in the classroom setting.
- Have students draw the money that they scoop out and label it to check for understanding of the coins' individual worth. Then ask them to count it up and write the total amount.
- On index cards, write different money amounts up to one dollar. Have students show you the amount with coins, then draw the amount of coins, show the same amount with fewer coins, and then write the amount in words (like 57 cents—with the cent sign). This could be done in a center.

- Have containers or cups on the students' desk to collect play money in. Allow students to earn coins for different things all week long. Have a class store where students can "buy" different items (e.g., tootsie rolls, fruit snacks, pencils, books from book orders, any teacher junk that is collected). Students have to count out the exact amount for the items they are purchasing.
- Play the game I Have, Who Has for an observational assessment.

Curriculum Extensions/Adaptations/Integration

- Use a number chart and coins to place on the number chart for students that can not grasp the concept of counting on. Tell the student the coins to use and teach them to put the coin that is worth the most on that number (i.e., a quarter on 25) then ask them to use a dime and show them how to count on from 25 ten more numbers and put the dime on 35. Do the same with nickels. Practice counting on with dimes and nickels from different amounts. Having the student physically count and put the coin on their chart which helps them to make a better connection of the counting on strategy. (Inclusion)
- Have the student show and draw different combinations of the same amount. Talk about how they figured it out. Once they understand the way to count on then work with them to draw the same amount with fewer coins. (Inclusion and Adaptation)
- Put students into pairs. Have them sit back to back. One
 partner takes some coins and tells how much money and how
 many coins he/she has. The other partner has to guess which
 coins the first person has. Take turns doing the activity.
 (Extensions)
- In the CORE Academy 2005, the book, *The Name Jar*, was read and then the students were to determine the price of someone's name. Use this same activity to buy items or words of interest to the students or to connect with other content that is being taught at the current time in the classroom.

Family Connection

• Cut out items out of the newspaper and together put a price on the pictures. Have students use play money or draw what coins they would use to buy the item.

- Show your student a certain amount and have them show you the same amount using different coin collections. Start with something simple like a quarter and work up to other amounts.
- Have student count the loose change that is in your wallet or pocket or in the laundry room.

Additional Resources

Books

The Money Tree, by Sarah Stewart; ISBN: 0-374-45295-4

Money, Money, Honey Bunny! by Marilyn Sadler; ISBN: 0-375-83370-6

Round and Round the Money Goes, by Melvin and Gilda Berger; ISBN: 0-8249-5310-X

The Case of the Shrunken Allowance, by Joanne Rocklin; ISBN: 0-590-12006-9

Alexander, Who Used to be Rich Last Sunday, by Judith Viorst; ISBN: 0-689-71199-9

The Coin Counting Book, by Rozanne Lanczak Williams; ISBN: 0-88106-326-6

Once Upon a Dime, by Nancy Kelly Ann; ISBN: 1-57091-161-4

The Go-Around Dollar, by Barbara Johnston Adams; ISBN: 0-02-700031-1

If you Made a Million, by David M. Schwartz; ISBN: 0-590-43608-2

Penny Pot, by Stuart J. Murphy; ISBN: 978-0-06-446717-9

The Big Buck Adventure, by Shelley Gill and Deborah Tobola; ISBN: 0-439-49150-9

Media

Carnival Countdown computer game; ISBN: 0-15-307966-5

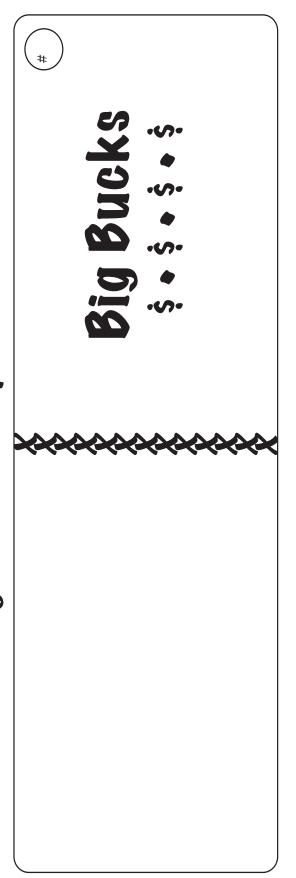
It Makes Sense to Trade Money Chart

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Big Bucks Money Wallets







Passing the Buck **Recording Sheet**



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Wallet Number	Total Amount

Passing the Buck **Recording Sheet**



Wallet Number	Total Amount	

Passing the Buck **Recording Sheet**

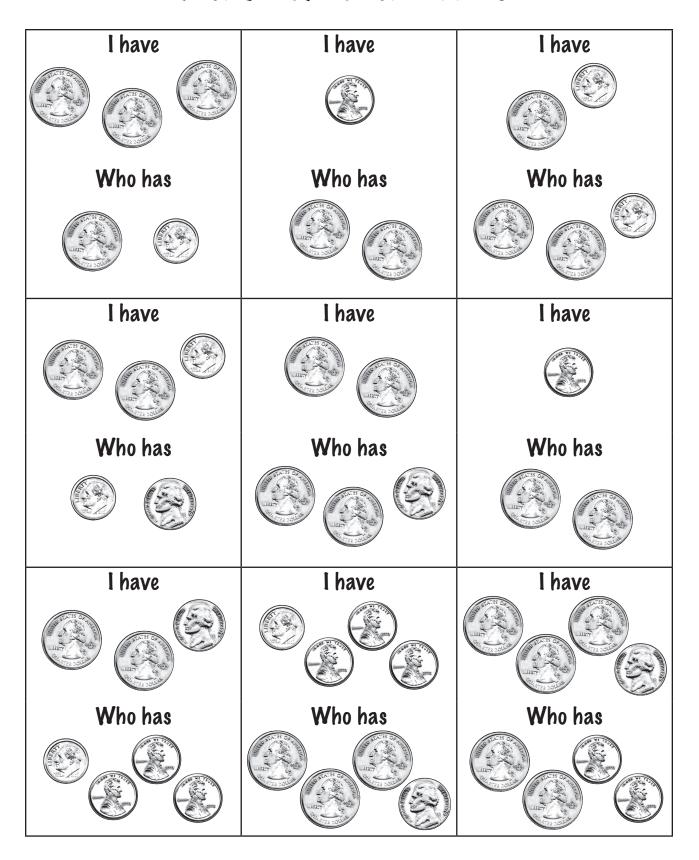


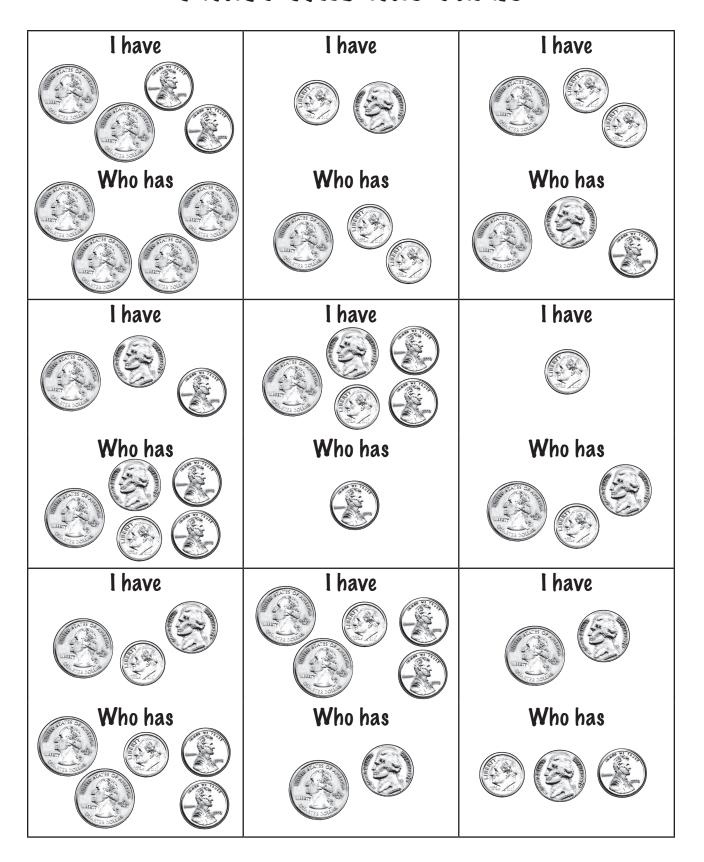
Total Amount

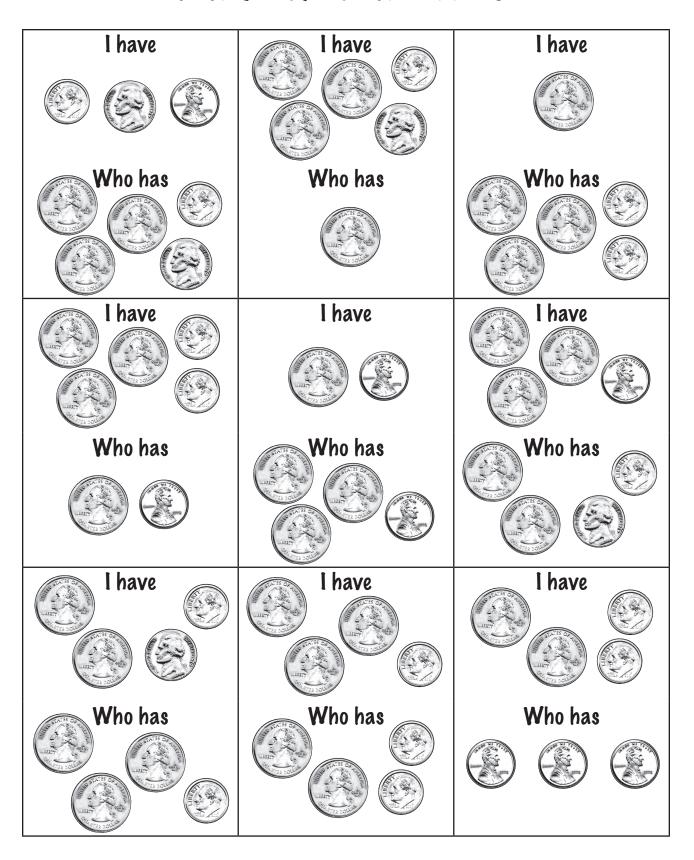
Passing the Buck **Recording Sheet**



Wallet Number	Total Amount







I have	I have	l have
Who has	Who has	Who has
I have	I have	l have
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Who has	Who has	Who has
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I have	I have	l have
Who has	Who has	Who has
	12.00 (HET)	

Stirring up Fractions

Standard I

Students will acquire number sense with whole numbers and fractions and perform operations with whole numbers.

Objective 2

Use fractions to identify parts of the whole and parts of a set.

Intended Learning Outcomes:

1. Demonstrate a positive learning attitude towards mathematics.

Content Connections:

Math Standard I

Objective 2

Connections

Background Information

The most important aspect of fractions is learning and understanding the relationship of part to whole. Students should be able to understand parts of a whole within solid objects and parts of a whole of a given set. They need to understand how many in each group when separating given sets into equal groups and represent the answer as a fraction. Finally, students should be encouraged to apply their knowledge of parts of a whole and separating given sets to solve word problems that have meaning in their lives. Through continuous practicing of these concepts, students will gain a clearer understanding of relationships of part to whole and representing it as a fraction.

Research Basis

Carpenter, T.P., Frank, M.L., Jacobs, V.R., Fennema, E., & Empson, S.B. (1999). *Children's mathematics: Cognitively guided instruction*, Heinemann, Portsmouth, NH. 28, 41.

Direct Modeling is a common strategy that students' use when learning to do mathematical problems of any kind that paves the way to more counting strategies. It is common for childrens' mathematical thinking to naturally attempt to model the action or relationships in math problems. They first directly model the situations or relationships with physical actions or relationships are at first somewhat visible but become less visible as childrens' thinking matures. Thus, childrens' solution strategies are, first, exact models of problems. As thinking progresses to using more counting strategies, their representation becomes more abstract.

Johnson, D.W., and R.T. Johnson. *Learning together and alone: Cooperative, competitive and individualistic learning* (5th edition). Boston: Allyn and Bacon, 1999.

Cooperative learning enhances students' enthusiasm for learning and their determination to achieve academic success. Cooperative learning provides unique learning experiences for students and offers opportunities for students to learn through speaking and listening processes as well as through reading and writing processes. In cooperative learning situations, students interact, assist one another with learning tasks, and promote one another's success. Students are held accountable for their own academic progress and task completion.

Invitation to Learn

As the students come to class, ask them to graph a pastry on the graph in the front of the room. Have four or five choices to pick from (e.g., apple pie, blueberry muffin, glazed donut, chocolate chip cookie, granola bar). Have each student pull a picture of a pastry out of a Krispy Kreme box. Have each student attach his or her pastry to the graph. Talk to the students about the different choices that are represented on the chart and how many people are in each one. Talk about the different main ingredients that are in the different choices. The teacher can ask a certain "pastry" group questions about them. For example, have the apple pie group come up in front of the class and ask "How many of you like red apples?" You may want to have only four students come up. Talk about the fraction that is represented.

Instructional Procedures

Let's Get Cooking

This is an activity that connects identifying parts of a whole with separating given sets into equal parts in a word problem format.

- 1. Ask students if they have ever seen their mom make an apple pie. Show students that you have brought ingredients today to make pies. Show the students a basket of 10 apples. Lay out five pie tins and mention you want to make five pies. Invite the student to help you separate the apples into the pie plates so that each pie has an equal amount of apples. Ask students how they were able to determine how many apples would be in each pie.
 - Continue this activity changing the number of apples to separate. You can also change the types of fruit for the pies.
 - Tell the students they are going to be chefs today and are going to be separating things into equal groups.

Materials

- 2. Put students into groups of four. Give each group a recipe box loaded with Let's Get Cooking Recipe Cards, a tub of manipulatives and Let's Get Cooking Work Mats for each group of students.
- 3. Have students work in cooperative groups pulling out recipe cards and working together to solve the problem using the manipulatives and work mats. Invite the students to share with each other how they came up with the amounts for each group.
- 4. Walk among the groups and ask students how they got their answers. Ask them how many apples were put in each pie pan to share the apples equally. Remind the students to re-read the card and answer the question on the card.
- 5. After sufficient practice as a group, have students answer cards individually then pass the card to the person sitting on their right. The students continue to do each of the cards in their group.
- 6. For as many sessions as necessary, provide students with the recipe box and different situations to answer. You can continue with the cooking theme or use questions that would be of interest in your class.
- 7. When the majority of students are proficient at solving the problems with manipulatives, hand out the recipe cards again and do the same activity asking students to make a picture or use words to solve the problem rather than using the manipulatives. Some students may need to use the manipulatives to help them make the picture. Walk around observing the work and invite students to come up and share their pictures and explanations with the class.
- 8. To reinforce understanding of how many are in each set, each day—or one day per week—place one of the cards under a desk or chair of a student for either the student or the class to solve as the problem for the day. Have students explain how they solved it.

GRAB My Fair Share

This is another option for helping students understand how many are in each set.

1. Read *Divide and Ride*. Explain to students that they are a part of the equal group. Have students get into groups of two, three, or four players. Have the students select a manipulative from the tub to use. A student takes a handful

Materials

- ☐ Divide and Ride
- Manipulatives
- ☐ Grab My Fair Share Recording Sheet

- of manipulatives. Each student needs a Grab My Fair Share Recording Sheet to record points.
- 2. Each student tries to separate his/her handful of manipulatives into two equal groups. If it can be done, they score two points. Next, students try to separate their same handful into four equal groups. If they can, they score four more points. If a student can make equal groups of two and four then he/she goes to the bonus round where they will be separating them into equal groups of three. If successful, they get a bonus of three points. When that player's turn is finished, the next player takes a turn.
- 3. Talk about the different amounts that were best to grab. Ask which would earn them the highest points? Keep playing the game. Circle the numbers that score the most points.

Discuss the numbers that are best for sharing into equal groups.

Eating My Part

This activity gives students practice in separating geometric shapes into halves, thirds, and fourths.

- 1. Read Eating Fractions. Tell the students to look at the different fractions shown in the book, (1/2, 1/3, 1/4). Discuss how each of the parts makes a whole.
- 2. Tell the students that they are going to get to make their own pastry. Provide students with Eating My Part Pastries. Have the students color or decorate their own pastry that will be shared with the class.
- 3. Once the pastries are completed then give them an Eating My Part Fraction Card that will tell them how to separate their pastry. This will allow the teacher to take a quick visual assessment to see if the student understands parts of a whole. Ask the students to tell how many parts of their pastry they would get.
- 4. Make a class bakery display where the students put all of the pastry fractions into nice displays of fraction sets. (e.g., All of the halves together, all of the thirds together, etc.).

Assessment Suggestions

Journaling Activity: Have students write about what their favorite pie would be. Have them tell how many apples or whatever fruit they choose to begin with. How many pies would they make? How many pieces of the fruit would go into

- ☐ Eating Fractions
- Eating My Part Pastries
- ☐ Eating My Part Fraction



- each pie? Would there be any left or would they be separated evenly?
- Use the pastry picture as a pre-assessment to the level of understanding a student has for simple parts of a whole.
- Having a student do the problem of the day with the recipe card under their desk each day will allow for a formal assessment of the level of understanding of the individual personally.
- Use the problem of the day recipe card activity to make a quick informal assessment. A variation of this would be to have the student that received the card, read it and have the whole class show how to solve it and have them turn it in to the teacher.
- When the students are playing *Grab My Fair Share*, the teacher can roam the room and make a quick visual assessment of understanding of the students of dividing into equal groups.

Curriculum Extensions/Adaptations/Integration

- The teacher may need to adapt the recipe and fraction cards for differentiated learning in the classroom.
- Some students may need more practice with manipulatives before moving onto the symbolic level.
- Print out a "fill-in" format for students' journal entry for those who have writing difficulties.
- A struggling reader may need to have more pictures with the words. Have a "student" partner that will assist them in the reading portion of the cards or have the students work with a partner when doing the manipulatives.
- An accelerated learner may need to have recipe and fraction cards that are higher numbers and a little more difficult to figure out. The learner can create his/her own *separation* problem and illustrate it. Allow them to share it with a friend or the class.
- Have students keep a fraction journal to write down the different ways that they have seen parts of a whole in real life. Have them draw a picture if they cannot explain it in words.

Family Connection

• Have students bring a small paper bag full of items that need to be divided out. Remind the students that the items that they

bring will not be returned. Have them create a recipe card for their item. Bring to class and share.

• Have students practice sorting socks into equal piles, the laundry, or other household items.

Additional Resources

Books

GO, Fractions, by Judith Bauer Stamper; ISBN 0-448-43113-0 Piece+Part=Whole, by Scott Gifford; ISBN: 0-439-74054-1 Safari Park, by Stuart J. Murphy; ISBN: 978-0-06-446245-7

Seven Blind Mice, by Ed Young; ISBN: 0-590-46971-1

Pizza Counting, by Christina Dobson; ISBN: 0-439-63243-9

Give Me Half! by Stuart J. Murphy; ISBN: 0-590-13691-7

Fraction Action, by Loreen Leedy; ISBN: 0-8234-1244-X

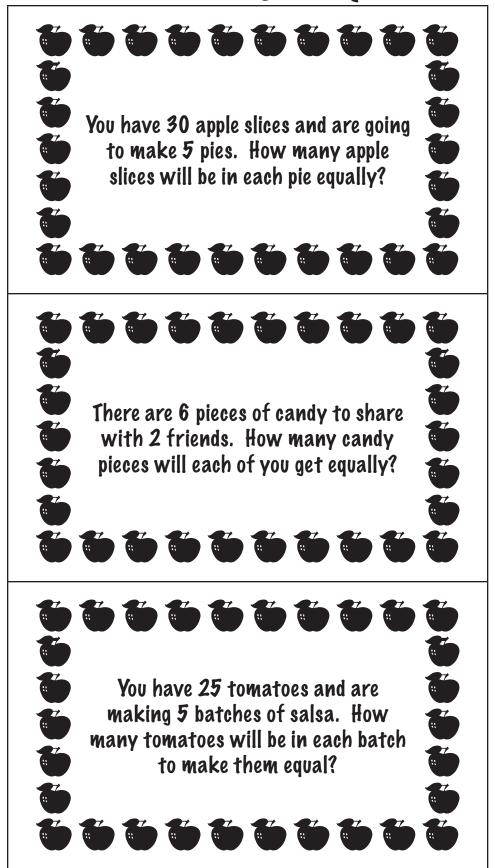
Fraction Fun, by Davis A. Adler; ISBN:0-8234-1341-1

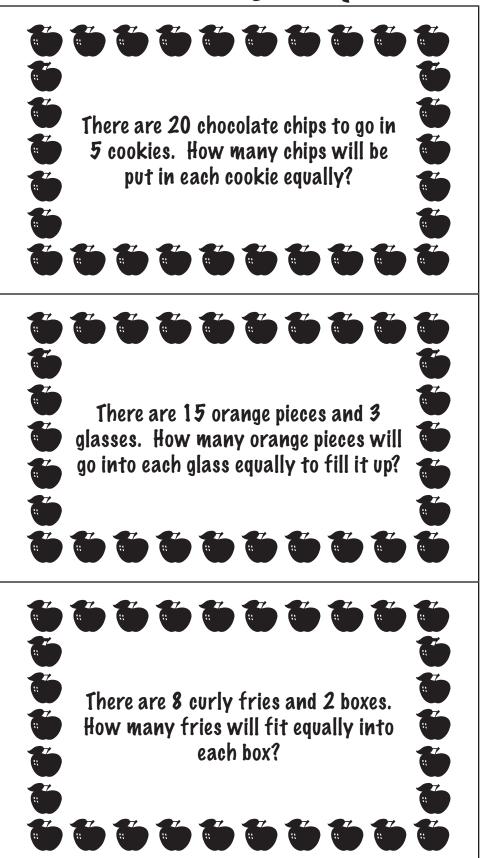
The 512 Ants on Sullivan Street, by Carol A. Losi; ISBN: 0-439-79854-X

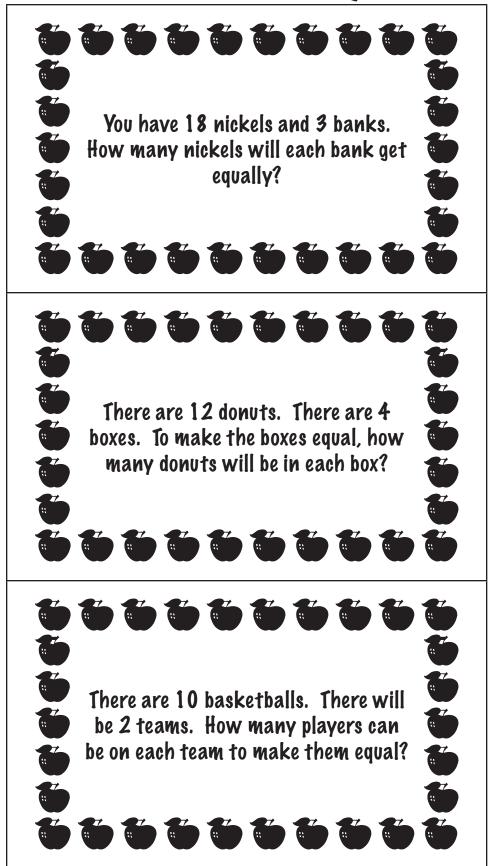
Pizza Pat, by Rita Golden Gelman; ISBN: 0-679-99134-4

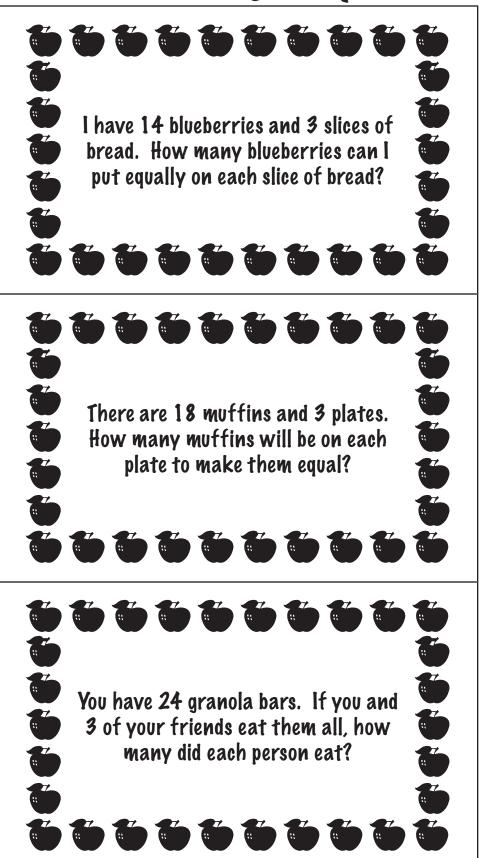
Divide and Ride, by Stuart J. Murphy; ISBN: 978-0-06-446710-0

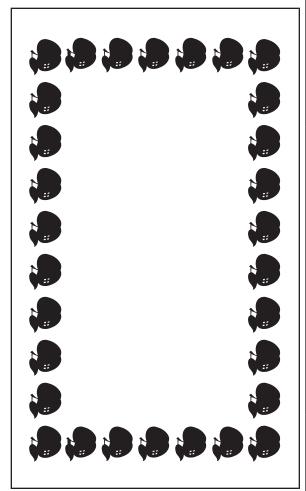
Eating Fractions, by Bruce McMillan: ISBN: 0-590-43771-2

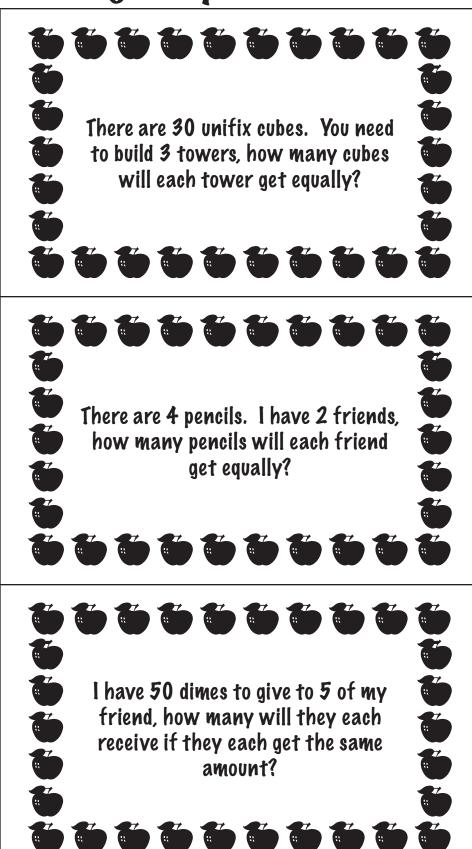












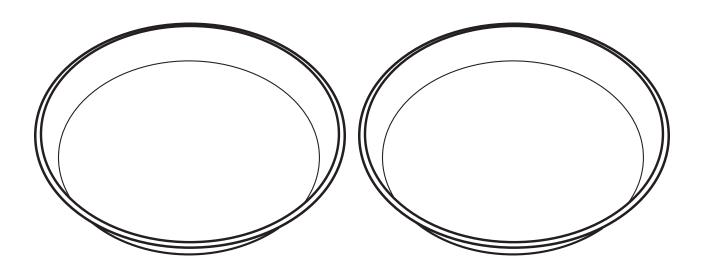
GRAB My Fair Share Recording Sheet

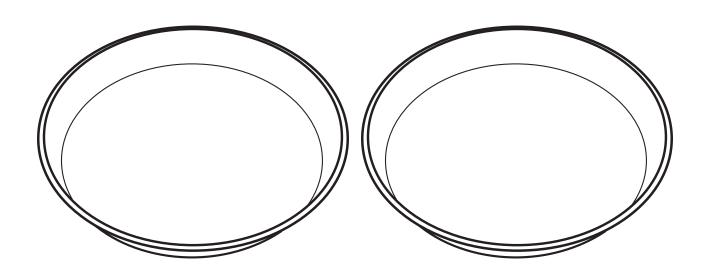
Number of Manipulatives	2 equal groups 2 pts.	4 equal groups 4 pts.	BONUS 3 equal groups 3 pts.	Total points for turn

GRAB My Fair Share Recording Sheet

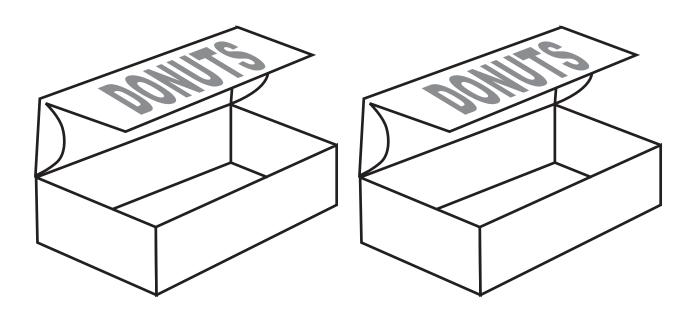
Number of Manipulatives	2 equal groups 2 pts.	4 equal groups 4 pts.	BONUS 3 equal groups 3 pts.	Total points for turn

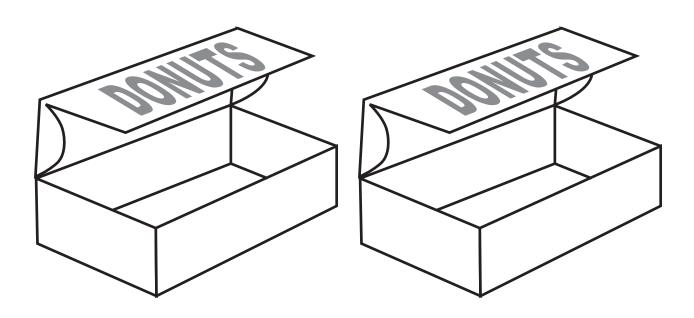
Let's Get Cooking Work Mats - Pie tin



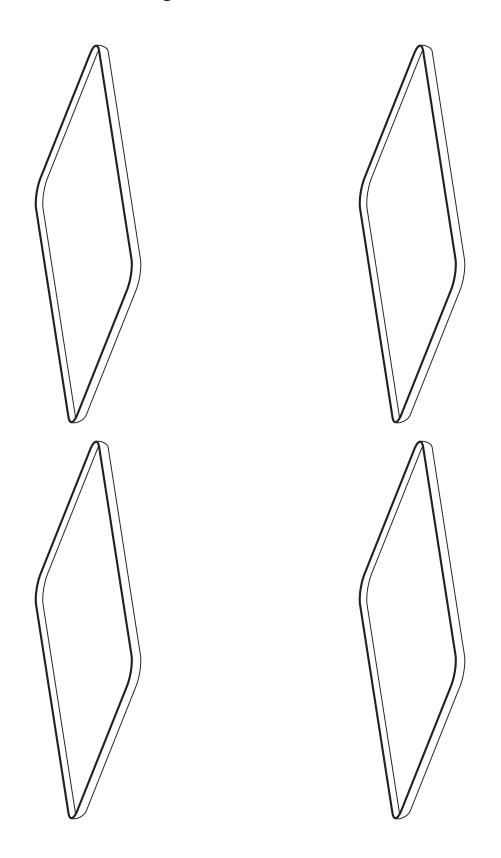


Let's Get Cooking Work Mats - Donut Box

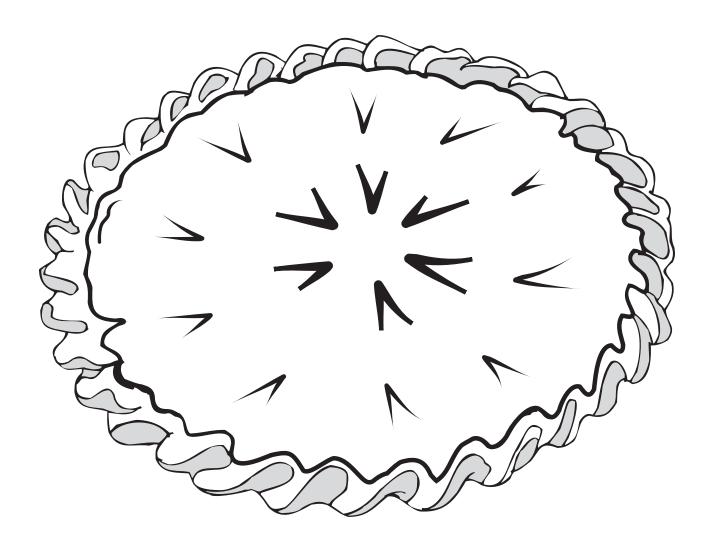




Let's Get Cooking Work Mats - Cookie Sheet



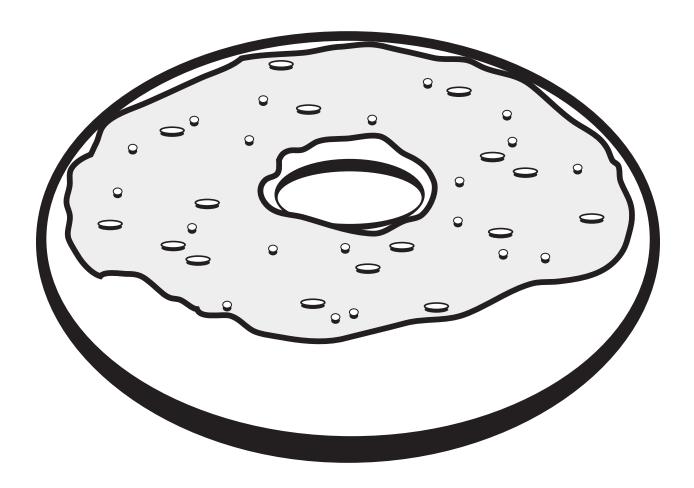
Eatin My Part Pastries - Apple Pie



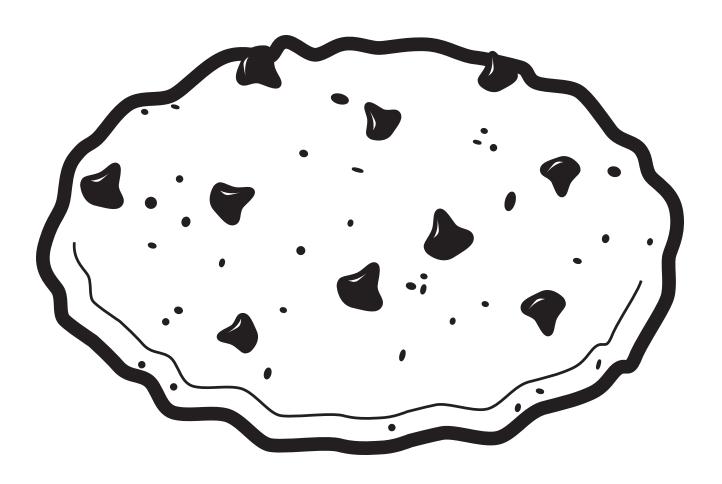
Eatin My Part Pastries - Muffin



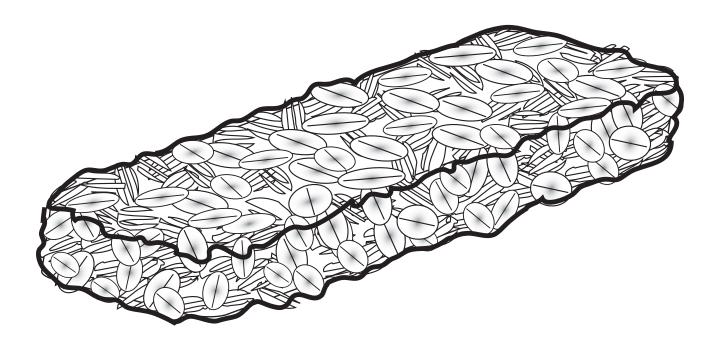
Eatin My Part Pastries - Donut



Eatin My Part Pastries - Cookie



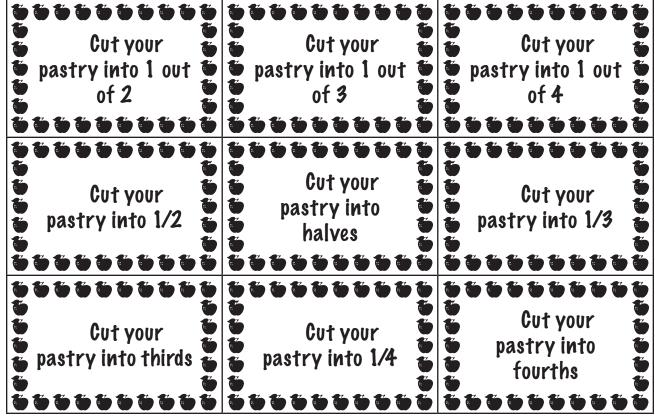
Eatin My Part Pastries - Granola Bar



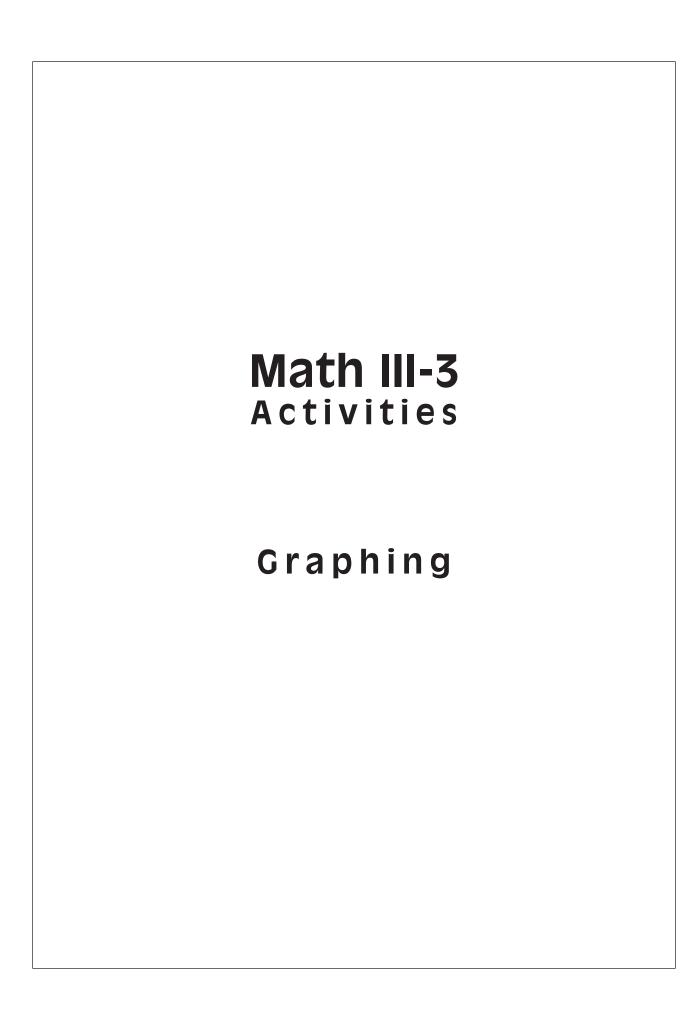
Eating My Part Fraction Cards

Cut your pastry into 1 out of 2	Cut your pastry into 1 out of 3	Cut your pastry into 1 out of 4
Cut your pastry into 1/2	Cut your pastry into halves	Cut your pastry into 1/3
Cut your pastry into thirds	Cut your pastry into 1/4	Cut your pastry into fourths

Eating My Part Fraction Cards



Academy Handbook Second Grade



Mr. E Graphs

Standard III:

Students will understand simple geometry and measurement concepts as well as collect and draw conclusions from data.

Objective 3:

Collect, record, organize, display, and interpret numerical data.

Intended Learning Outcomes:

5. Understand and use basic concepts and skills

Content Connections:

Content III-1, 2, 3; Organize their understanding of environment

Math Standard III

Objective 3

Connections

Background Information

A graph is a tool that can show you things quickly. A graph uses pictures, shapes and colors instead of numbers to tell us how many of something there is. In Second grade students are responsible to use a variety of methods to organize, display, and label information, including keys, using pictographs, tallies, bar graphs, and organized tables.

In this lesson we will explore several ways to sort information according to certain attributes. We will then graph that information so we will understand quickly what we have sorted. Because of the versatility of graphs/data organizers being integrated in a multitude of other subject areas, this would serve as a valuable foundational lesson to teach at the beginning of the school year so that extension lessons can follow throughout the year.

Research Basis

Lee, M., & Miller, M., (1993). *Great Graphing*. Scholastic Inc. New York, NY ISBN 0-590-49470-8

Learning Graphing skills benefits children in a variety of ways; it encourages an investigative spirit as questions are generated, conjectures are made, and relationships are discovered. Higher-level critical skills are involved and communications skills are reinforced as children discuss and write about their methods and discoveries. Graphing help children appreciate how useful math can be in the world outside the classroom.

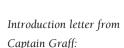
Invitation to Learn

Write the graph title "Today's lunch" on the board. Then under the title write "School lunch" and "Home Lunch," and have them line up behind the graph headings according to what they will be eating that day. Tell them they have just made a human bar graph. Record numbers on a piece of paper to refer to later and start on Instructional Procedures.

Sorting package contains several objects from each of the following categories: plants, animals, fantasy, reality, food, numbers, families, and communities where we live (urban, suburban, and rural).

Materials

- ☐ Math Concepts for Primary Grades DVD Chapters 2, 3, and 5
- ☐ Four Letters from Captain Graff
- Evidence / fact sheet
- ☐ Clue Graph
- ☐ Evidence mystery tags
- Detective Notebook
- Detective Badges
- ☐ 19 cases



Dear Mr. E,

I have enclosed a number of clues to a current case that we are working on. Please see what you and your assistant detectives can make of these items and get back with me.

Thanks for your help with this,

Your Friend,

Captain Graff

4-4

Instructional Procedures

Case 1

- 1. Teacher arrives in the classroom dressed as a detective carrying a briefcase that contains *The Sorting Package*, (containing several objects from each of the following categories: plants, animals, fantasy, reality, food, numbers, families, and communities) the *Introduction letter from Captain Graff*, and introduces him/herself as MR. E. He/She welcomes the students to the Math Graph Detective Academy and tells students that they will be assisting in an important math mystery adventure. Inform them that they will gain important information for helping to solve the case by watching a top-secret video clip. Have students watch "3 Skill Building Sort and Group" Chapter 3 Section 1. Stop after 3:26.
- 2. Discuss what was disclosed as the first step in classifying (using your five senses to help you observe what things are alike). Invite students to help you sort the objects that arrived from Captain Graff into 5 groups by traits determined as a class. Once they have been divided, place the items in gallon size baggies and write on the *Evidence Mystery Tags* what trait each group is sorted by.
- 3. Break your class into five groups and have them subdivide their mystery tagged bags into smaller groups. When each group has completed their sorting have them stay where their group is and share how they separated their bags into different groups. Have each group place all objects from their bag back into the gallon bag and collect the bags at the end.

Case 2

- 1. Letter 1 arrives from Captain Graff asking if they have solved the mystery. Review with the class what they learned about sorting objects so far. Review as a class how they sorted their evidence mystery tagged bags as smaller groups yesterday.
- 2. Ask the class: how can we send all this information that we have been solving to the Captain? We can't just mail him all the evidence back. What would be an easier way to get him the information? On the DVD show chapter 2 "Skill Building with Graphs." Stop at the pictograph section of this chapter 1:45. Discuss the definition of a graph as given in this section: a graph is a tool. It can show you things quickly. A graph uses pictures, shapes, and colors instead of numbers to tell us how many of something there is.
- 3. Introduce their *Detective Notebook* (a notebook made to collect clues or data). Have them write the definition of a graph in their notebook. Ask: remember how we made a class human bar graph in class? Have any of you done graphs before? What other kinds of graphs are there? Continue on to the pictograph section of the DVD. Chapter 2 1:47.
- 4. As a class, return to the information gathered in the invitation to learn, and draw a pictograph on a poster board of how they lined up. Then take that information from the pictograph, and have them help you make a bar graph of their lunch for that day.
- 5. Provide each student with an *Evidence/Fact Sheet* paper. Have them go back to their same mystery tagged bags they sorted on the first day. Have them collect facts or clues on their sheet. Taking the facts they have gathered, have them then make a bar graph with their detective team on their findings.

Case 3

- 1. Letter 2 arrives from Captain Graff stating that more information is needed to solve the mystery. Show the video on charts, Chapter 5 Charts, Graphs and Diagrams. Review what a pictograph is after the video.
- 2. Discuss each type of graph. As you discuss each graph from the video with the class, hand out the *Clue Graph* pages for them to glue into their clue diary. Invite them to write notes and draw pictures as you discuss these things, so they can be

Letter 1:

Dear Mr. E and associates,

I was just writing to check on the progress you have made on our top-secret case. I would love to see what you have come up with so I can compare it with what we were thinking here at the station. Please let me know what you have discovered as soon as possible. We are excited to hear from you.

Your Friend, Captain Graff

Letter 2:

Dear Mr. E and associates,

Thank you for the helpful information you have sent to us. I was thinking about the same thing. I know that this case is not yet solved and would love to hear any other information you may have to help crack this case, I know we are close.

Anxious to hear from you! Your Friend,

Captain Graff

Letter 3:

Dear Mr. E and Associates,

Thank you for your help in solving our mystery. You truly have learned a lot about sorting information to be used to make a graph. I have another case that I need your help with. I am attending a family reunion and my son wanted to keep track of facts that he gathers from the reunion. Can you help us think of different facts that we could collect to share with his teacher for extra credit? I have included a book of the facts with this letter. Good luck! I am excited to hear from you all.

Your Friend,

Captain Graff

Letter 4:

Dear Mr. E and Associates,

WOW! You have all become such great detectives! Thank You for helping me solve the case. I have a huge caseload that has just come up and would love any help you can give me with this. I know that you are all first rate detectives, and that these cases will be solved with ease! Good Luck.

Your Friend,

Captain Graff

good detectives when they get back to their evidence mystery tagged bags.

Case 4

- 1. *Letter 3* arrives from Captain Graff thanking the class for their help with the mystery. Read the letter to the class.
- 2. Pass out the *Evidence/Fact Sheet* and (as time allows), read sections of *Graphs* by Bonnie Bader to the class. Pause at each fact, or clue for the students to record the data presented. Do not show the pictures of the book at this time.
- 3. When you have completed the book or current section of the book you would like to work on, discuss the data from the book. Have them think of ways that they could graph the information they have collected. Working in small groups, have them pick a section of data or the current section you are on, and think of which type of graph they could use to show the facts the best with the class.
- 4. After they have worked on their graphs, have them share with the class what they found out. Prepare that information to send to the captain.
- 5. Before "mailing" the letter to the Captain, re-read *Family Reunion* to the class and compare their graphs to the ones in the book. Discuss what types of graphs his son used compared to what they used as a class.

Case 5

- 1. *Letter 4* arrives from Captain Graff thanking them for solving the cases that he had assigned to them. Read the letter to the class.
- 2. Divide your class into seven groups and explain the *Seven Centers with Nineteen Cases* needing to be solved. Provide each detective group with materials needed at each station, and several *Evidence Fact Sheets* for them to gather their clues on and put in their *Detective Notepad*, have them write their case number on their *Evidence Fact Sheets* and glue into their *Detective Notepad*). Check each graph for accuracy against the case number that they received.
- 3. Review each type of graph. Ask each student to tell and record in his or her clue journal his or her favorite graph discussed in the book. Present each detective with an official *Great Graph Detective* badge.

Assessment Suggestions

- 1. Check the data and graphs from the 19 cases they have solved.
- 2. Check their Evidence Fact Sheets they completed on case 2 and 5.
- 3. Include some of the 19 cases in a center for them to choose their case to solve. Check their work.

Curriculum Extensions/Adaptations/Integration

- Morning message: Put a letter for Mr. E filled with corrections for them to solve on the board for their daily work.
- Monthly Integrated Graphing Ideas:
- August: Summer Fun—Provide a sun-shaped paper for students to draw a favorite summer memory from one of the following categories: traveling, sports, family activities, other. Graph results.
- September: Favorite School Subjects—Provide each student with piece of an apple pie (a circle approximately 14 inches in diameter, cut into as many equal sized pieces as you have students). They need to be equal pieces, so you may have to include yourself or other staff member. Have the students color their piece according to what their favorite school subject is. red: math, yellow: spelling, orange: reading, and so on. Glue each piece onto a circle, grouping them according to their color.
- October: Pumpkins—Provide each student with a piece of orange art paper. Have them draw and cut out a pumpkin (you should get many sizes and shapes). Provide different kinds of art supplies to decorate their pumpkin with, such as pain, glitter, sequence. Bar Graph the pumpkins by traits determined by the class.
- November: Food Groups—Provide each student with a turkey clip art to draw their favorite type of food they eat on Thanksgiving Day on the belly of the turkey. Provide choices for them from each of the food groups. Graph turkeys on a food pyramid chart according to what they drew. Make a pictograph of what they have drawn.
- December: Money—Provide pictures of candy price marked with pennies, nickels, dimes, or quarters. Have them graph their candy according to the coin their candy is labeled with. To

- make it more challenging, have students graph according to the sum of their coins. Discuss the graph.
- January: Weather Affects on Animals—Make a Pictograph of how the weather affects animals. Have the students draw an animal they would like to sort according to what the animal does in the winter, hide, migrate, hibernate or stay active. Discuss the graph.
- February: Letter Writing—Read the story *Who Loves Mr. Hatch* by Ellen Spinelli. Discuss how the nice letter to Mr. Hatch made him a happier, nicer person. Have them choose to write a letter to a family member, friend, school staff, or other to brighten their day. Provide them with an envelope to write the name of the person the letter is going to. Bar graph the envelopes according to who they are sent to, a family member, friend, school staff, or other. Discuss the graph.
- March: Weather—Bar graph the daily weather for the month, graph the students favorite kind of weather.
- April: 'Egg'cellent Animals—Graph according to whether animals are born live or if they hatch from eggs. Have students draw their babies on a square-shaped piece of paper if they are born live and on an egg shaped piece of paper if they hatch from an egg. Graph results. Discuss other ways you could graph these animals as a class.
- May: Second Grade Memories—As a class, make a timeline of the school activities you have had throughout the year. To create a class graph, have the students illustrate their favorite activity on a Post-it® note and place it in a category such as: field trips, friends, room-mother parties, assemblies, holidays, other.

Family Connections

- 1. Gather data about family—eye color, hair color, boys, girls, etc., make a graph at home.
- 2. Have them graph their favorite toys and bring data and how they sorted their toys.

Additional Resources

Books

Graphs, by Bonnie Bader; ISBN 044842962 Graphs, by Sara Pistoia; ISBN 1-59296-687-X Who's Got Spots? by Linda W. Aber; ISBN 0-439-3326-5

Tiger Math Learning to Graph from a Baby Tiger, by Ann Whitehead Nagda and Cindy Bickel; ISBN 0-8050-7161-X

Get up and Go! by Stuart Murphy; ISBN 0-590-23811-6

A Tiger Cub Grows up, by Joan Hewett; ISBN 0-439-44193-5

The Great Graph Contest, by Loreen Leedy; ISBN 0-439-82838-4

Let's Graph, by Lisa Trumbauer; ISBN 0-7368-2891-5

Graph Games, by Susan Holding; ISBN 0-690-34964-5, 0-690-34965-3 (LB)

Great Graphing, by Martin Lee and Marcia Miller; ISBN 0-590-49470-8

Graph-A-Day, by Michelle Long Windmoeller; ISBN 0-7424-0146-0

Graphing Primer, by Laura Duncan Choate and JoAnn King Okey; ISBN 0-86651-486-4

Media

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